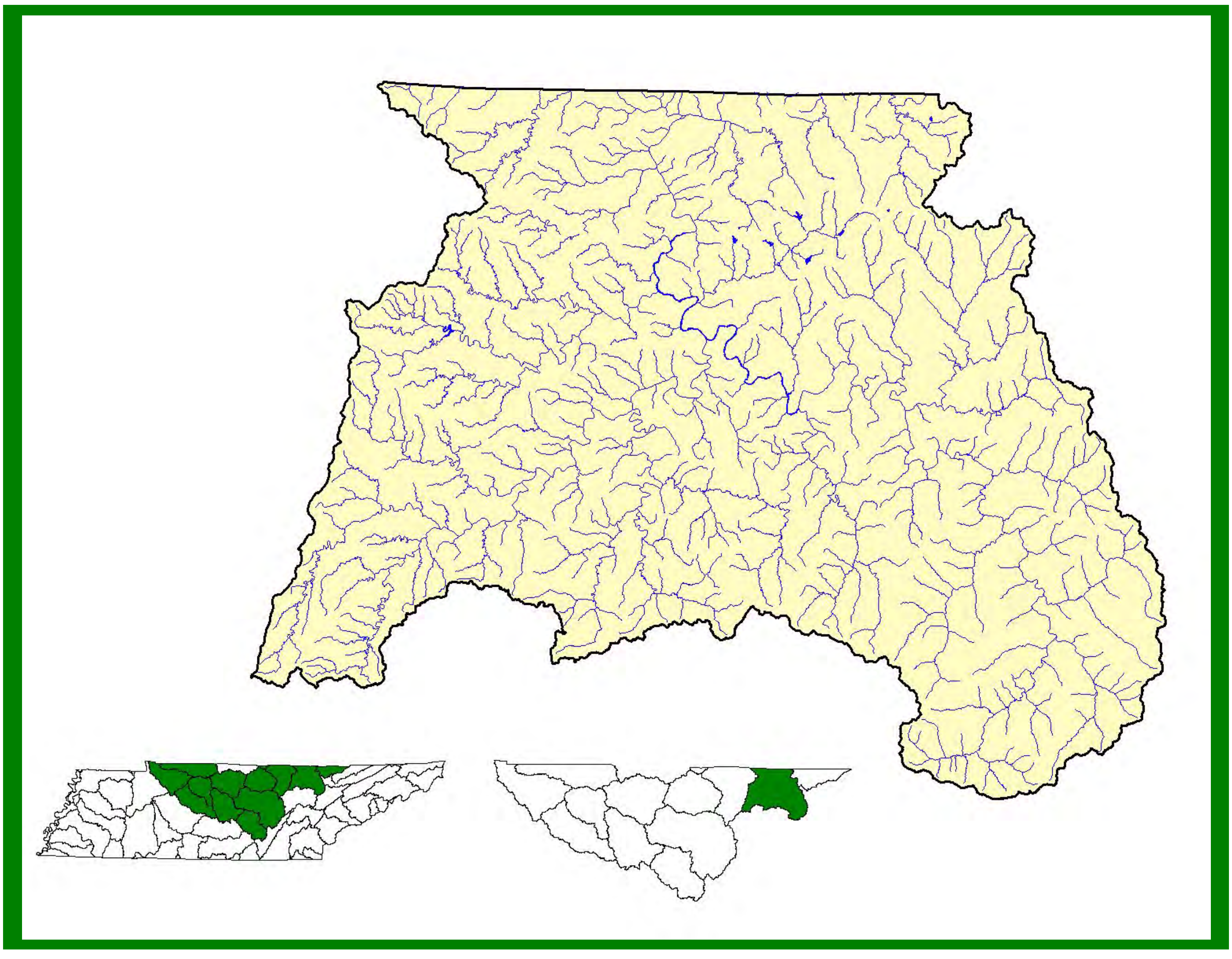
SOUTH FORK CUMBERLAND RIVER WATERSHED (05130104) OF THE CUMBERLAND RIVER BASIN

WATERSHED WATER QUALITY MANAGEMENT PLAN



TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER POLLUTION CONTROL
WATERSHED MANAGEMENT SECTION

Presented to the people of the South Fork Cumberland River Watershed by the Division of Water Pollution Control October 4, 2007.

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SOUTH FORK CUMBERLAND RIVER WATERSHED
WATER QUALITY MANAGEMENT PLAN

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GLOSSARY

1Q20. The lowest average 1 consecutive days flow with average recurrence frequency of once every 20 years.

30Q2. The lowest average 3 consecutive days flow with average recurrence frequency of once every 2 years.

7Q10. The lowest average 7 consecutive days flow with average recurrence frequency of once every 10 years.

303(d). The section of the federal Clean Water Act that requires a listing by states, territories, and authorized tribes of impaired waters, which do not meet the water quality standards that states, territories, and authorized tribes have set for them, even after point sources of pollution have installed the minimum required levels of pollution control technology.

305(b). The section of the federal Clean Water Act that requires EPA to assemble and submit a report to Congress on the condition of all water bodies across the Country as determined by a biennial collection of data and other information by States and Tribes.

AFO. Animal Feeding Operation.

Ambient Sites. Those sites established for long term instream monitoring of water quality.

ARAP. Aquatic Resource Alteration Permit.

Assessment. The result of an analysis of how well streams meet the water quality criteria assigned to them.

Bankfull Discharge. The momentary maximum peak flow before a stream overflows its banks onto a floodplain.

Basin. An area that drains several smaller watersheds to a common point. Most watersheds in Tennessee are part of the Cumberland, Mississippi, or Tennessee Basin (The Conasauga River and Barren River Watersheds are the exceptions).

Benthic. Bottom dwelling.

Biorecon. A qualitative multihabitat assessment of benthic macroinvertebrates that allows rapid screening of a large number of sites. A Biorecon is one tool used to recognize stream impairment as judged by species richness measures, emphasizing the presence or absence of indicator organisms without regard to relative abundance.

BMP. An engineered structure or management activity, or combination of these, that eliminates or reduces an adverse environmental effect of a pollutant.

BOD. Biochemical Oxygen Demand. A measure of the amount of oxygen consumed in the biological processes that break down organic and inorganic matter.

CAFO. Concentrated Animal Feeding Operation.

Designated Uses. The part of Water Quality Standards that describes the uses of surface waters assigned by the Water Quality Control Board. All streams in Tennessee are designated for Recreation, Fish and Aquatic Life, Irrigation, and Livestock Watering and Wildlife. Additional designated uses for some, but not all, waters are Drinking Water Supply, Industrial Water Supply, and Navigation.

DMR. Discharge Monitoring Report. A report that must be submitted periodically to the Division of Water Pollution Control by NPDES permitees.

DO. Dissolved oxygen.

EPA. Environmental Protection Agency. The EPA Region 4 web site is http://www.epa.gov/region4/

Field Parameter. Determinations of water quality measurements and values made in the field using a kit or probe. Common field parameters include pH, DO, temperature, conductivity, and flow.

Fluvial Geomorphology. The physical characteristics of moving water and adjoining landforms, and the processes by which each affects the other.

HUC-8. The 8-digit Hydrologic Unit Code corresponding to one of 54 watersheds in Tennessee.

HUC-10. The 10-digit NRCS Hydrologic Unit Code. HUC-10 corresponds to a smaller land area than HUC-8.

HUC-12. The 12-digit NRCS Hydrologic Unit Code. HUC-12 corresponds to a smaller land area than HUC-10.

MRLC. Multi-Resolution Land Classification.

MS4. Municipal Separate Storm Sewer System.

Nonpoint Source (NPS). Sources of water pollution without a single point of origin. Nonpoint sources of pollution are generally associated with surface runoff, which may carry sediment, chemicals, nutrients, pathogens, and toxic materials into receiving waterbodies. Section 319 of the Clean Water Act of 1987 requires all states to assess the impact of nonpoint source pollution on the waters of the state and to develop a program to abate this impact.

NPDES. National Pollutant Discharge Elimination System. Section 402 of the Clean Water Act of 1987 requires dischargers to waters of the U.S. to obtain NPDES permits.

NRCS. Natural Resources Conservation Service. NRCS is part of the federal Department of Agriculture. The NRCS home page is http://www.nrcs.usda.gov

Point Source. Any discernable, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include agricultural storm water discharges and return flows from irrigated agriculture (Clean Water Act Section 502(14)).

Q Design. The average daily flow that a treatment plant or other facility is designed to accommodate.

Reference Stream (Reference Site). A stream (site) judged to be least impacted. Data from reference streams are used for comparisons with similar streams.

SBR. Sequential Batch Reactor.

Stakeholder. Any person or organization affected by the water quality or by any watershed management activity within a watershed.

STATSGO. State Soil Geographic Database. STATSGO is compiled and maintained by the Natural Resources Conservation Service.

STORET. The EPA repository for water quality data that is used by state environmental agencies, EPA and other federal agencies, universities, and private citizens. STORET (Storage and Retrieval of National Water Quality Data System) data can be accessed at http://www.epa.gov/storet/

TDA. Tennessee Department of Agriculture. The TDA web address is http://www.state.tn.us/agriculture

TDEC. Tennessee Department of Environment and Conservation. The TDEC web address is http://www.tdec.net

TMDL. Total Maximum Daily Load. A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and an allocation of the amount to the pollutant's sources. A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. The calculation includes a margin of safety to ensure that the waterbody can be used for the purposes the State has designated. The calculation must also account for seasonal variation in water quality. A TMDL is required for each pollutant in an impaired stream as described in Section 303 of the Federal Clean Water Act of 1987. Updates and information on Tennessee's TMDLs can be found at http://www.tdec.net/wpc/tmdl/

TMSP. Tennessee Multi-Sector Permit.

USGS. United States Geological Survey. USGS is part of the federal Department of the Interior. The USGS home page is http://www.usgs.gov/.

WAS. Waste Activated Sludge.

Water Quality Standards. A triad of designated uses, water quality criteria, and antidegradation statement. Water Quality Standards are established by Tennessee and approved by EPA.

Watershed. A geographic area which drains to a common outlet, such as a point on a larger stream, lake, underlying aquifer, estuary, wetland, or ocean.

WET. Whole Effluent Toxicity.

WWTP. Waste Water Treatment Plant

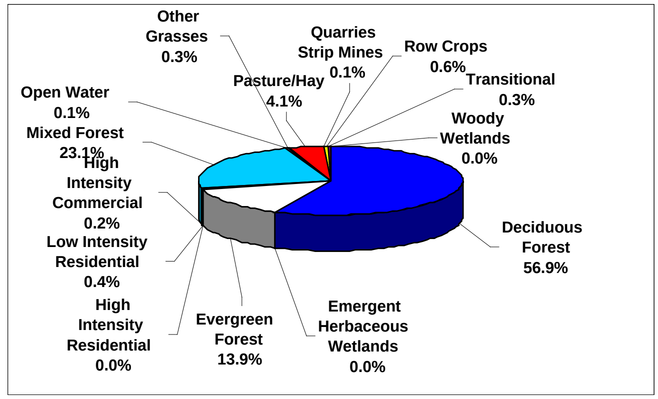
Summary – South Fork Cumberland River Watershed (05130104)

In 1996, the Tennessee Department of Environment and Conservation Division of Water Pollution Control adopted a watershed approach to water quality. This approach is based on the idea that many water quality problems, like the accumulation of point and nonpoint pollutants, are best addressed at the watershed level. Focusing on the whole watershed helps reach the best balance among efforts to control point sources of pollution and polluted runoff as well as protect drinking water sources and sensitive natural resources such as wetlands. Tennessee has chosen to use the USGS 8-digit Hydrologic Unit Code (HUC-8) as the organizing unit.

The Watershed Approach recognizes awareness that restoring and maintaining our waters requires crossing traditional barriers (point *vs.* nonpoint sources of pollution) when designing solutions. These solutions increasingly rely on participation by both public and private sectors, where citizens, elected officials, and technical personnel all have opportunities to participate. The Watershed Approach provides the framework for a watershed-based and community-based approach to address water quality problems.

Chapter 1 of the South Fork Cumberland River Watershed Water Quality Management Plan discusses the Watershed Approach and emphasizes that the Watershed Approach is not a regulatory program or an EPA mandate; rather it is a decision-making process that reflects a common strategy for information collection and analysis as well as a common understanding of the roles, priorities, and responsibilities of all stakeholders within a watershed. Traditional activities like permitting, planning and monitoring are also coordinated in the Watershed Approach.

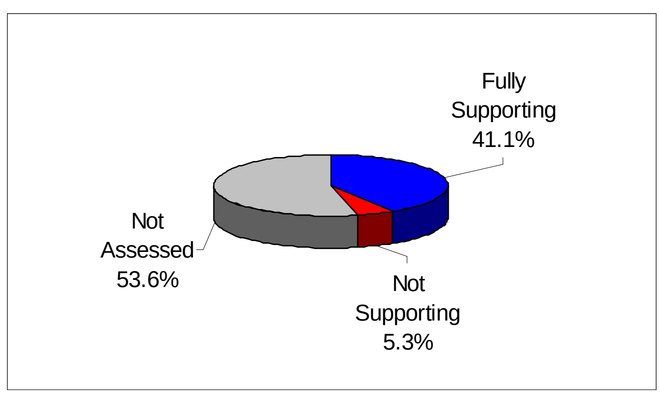
A detailed description of the watershed can be found in Chapter 2. The South Fork Cumberland River Watershed is approximately 1,365 square miles (976 mi^2 in Tennessee) and includes parts of six Tennessee counties. A part of the Cumberland River drainage basin, the watershed has 1,378 stream miles and 5 lake acres in Tennessee.



Land Use Distribution in the Tennessee Portion of the South Fork Cumberland River Watershed.

One national river and recreation area, four designated state natural areas, three state forests, one state park, and three wildlife management areas are located in the watershed. Eighty-eight rare plant and animal species have been documented in the watershed, including eight rare fish species, five rare mussel species, and three rare crustacean species. Portions of eight streams in the South Fork Cumberland River Watershed are listed in the National Rivers Inventory as having one or more outstanding natural or cultural values and a portion of the South Fork Cumberland River is designated as Outstanding National Resource Water.

A review of water quality sampling and assessment is presented in Chapter 3. Using the Watershed Approach to Water Quality, 303 sampling events occurred in the South Fork Cumberland River Watershed in 2000-2005. These were conducted at ambient, ecoregion or watershed monitoring sites. Monitoring results support the conclusion that 88.6% of stream miles and 100% of lake acres assessed fully support one or more designated uses.



Water Quality Assessment of Streams and Rivers in the Tennessee Portion of the South Fork Cumberland River Watershed. Assessment data are based on the 2004 Water Quality Assessment of 1,378 stream miles in the watershed.

Also in Chapter 3, a series of maps illustrate overall use support in the watershed, as well as use support for the individual uses of Fish and Aquatic Life Support, Recreation, Irrigation, and Livestock Watering and Wildlife. Another series of maps illustrate streams that are listed for impairment by specific causes (siltation, pathogens).

Point and Nonpoint Sources are addressed in Chapter 4. Chapter 4 is organized by HUC-12 subwatersheds. Maps illustrating the locations of STORET monitoring sites and stream gauging stations are also presented in each subwatershed.

HUC-10	HUC-12
0513010401	051301040101 (New River)
	051301040102 (New River)
	051301040103 (Smokey Creek)
	051301040104 (New River)
	051301040105 (Buffalo Creek)
	051301040106 (New River)
	051301040107 (Brimstone Creek)
	051301040108 (New River)
0513010402	051301040201 (North Prong Clear Fork)
	051301040202 (South Prong Clear Fork)
	051301040203 (Upper Clear Fork)
	051301040204 Crooked Creek)
	051301040205 (Lower Clear Fork)
0513010403	051301040301 (Upper Whiteoak Creek)
	051301040302 (Camp Creek)
	051301040303 (Black Wolf Creek)
	051301040304 (Lower Whiteoak Creek)
0513010404	051301040401 (Big South Fork)
	051301040402 (Pine Creek)
	051301040403 (Station Camp Creek)
	051301040404 (Big South Fork)
	051301040405 (Bear Creek)
	051301040407 (Roaring Paunch Creek)
	051301040408 (Rock Creek)
0513010405	051301040501 (North Whiteoak Creek)
	051301040502 (Laurel Fork)
0513010407	051301040701 (Little South Fork)

The Tennessee Portion of the South Fork Cumberland River Watershed is Composed of twenty-seven USGS-Delineated Subwatersheds (12-Digit Subwatersheds).

Point source contributions to the Tennessee portion of the South Fork Cumberland River Watershed consist of seven individual NPDES-permitted facilities, three of which discharge into streams that have been listed on the 2004 303(d) list. Other point source permits in the watershed (as of October 4, 2007) are Mining Permits (32), Tennessee Multi-Sector Permits (18), Aquatic Resource Alteration Permits (4), Ready Mix Concrete Plant Permits (2), and Concentrated Animal Feeding Operation Permits (2). Agricultural operations include cattle, chicken, hog, and sheep farming. Maps illustrating the locations of permit sites and tables summarizing livestock practices are presented in each subwatershed.

Chapter 5 is entitled *Water Quality Partnerships in the South Fork Cumberland River Watershed* and highlights partnerships between agencies and between agencies and landowners that are essential to success. Programs of federal agencies (Natural Resources Conservation Service, U.S. Fish and Wildlife Service, U.S. Geological Survey, National Park Service, and U.S. Army Corps of Engineers), and state agencies (TDEC/State Revolving Fund, TDEC Division of Water Supply, Tennessee Department of Agriculture, and Kentucky Division of Water) are summarized. Local initiatives of organizations active in the watershed (South Fork Watershed Association, Cumberland River Compact, Cumberland Mountain RC&D Council, The Nature Conservancy, and Hull-York Lakeland RC&D Council) are also described.

Point and Nonpoint source approaches to water quality problems in the South Fork Cumberland River Watershed are addressed in Chapter 6. Chapter 6 also includes comments received during public meetings, links to EPA-approved TMDLs in the watershed, and an assessment of needs for the watershed.

The full South Fork Cumberland River Watershed Water Quality Management Plan can be found at: http://www.state.tn.us/environment/wpc/watershed/wsmplans/

CHAPTER 1

WATERSHED APPROACH TO WATER QUALITY

1.1 BACKGROUND. The Division of Water Pollution Control is responsible for administration of the Tennessee Water Quality Control Act of 1977 (TCA 69–3–101). Information about the Division of Water Pollution Control, updates and announcements, may be found at http://www.state.tn.us/environment/wpc/index.html, and a summary of the organization of the Division of Water Pollution Control may be found in Appendix I.

The mission of the Division of Water Pollution Control is to abate existing pollution of the waters of Tennessee, to reclaim polluted waters, to prevent the future pollution of the waters, and to plan for the future use of the waters so that the water resources of Tennessee might be used and enjoyed to the fullest extent consistent with the maintenance of unpolluted waters.

The Division monitors, analyzes, and reports on the quality of Tennessee's water. In order to perform these tasks more effectively, the Division adopted a Watershed Approach to Water Quality in 1996.

This Chapter summarizes TDEC's Watershed Approach to Water Quality.

1.2 WATERSHED APPROACH TO WATER QUALITY. The Watershed Approach to Water Quality is a coordinating framework designed to protect and restore aquatic systems and protect human health more effectively (EPA841-R-95-003). The Approach is based on the concept that many water quality problems, like the accumulation of pollutants or nonpoint source pollution, are best addressed at the watershed level. In addition, a watershed focus helps identify the most cost-effective pollution control strategies to meet clean water goals. Tennessee’s Watershed Approach, updates and public participation opportunities, may be found on the web at http://www.state.tn.us/environment/wpc/wshed1.htm.

Watersheds are appropriate as organizational units because they are readily identifiable landscape units with readily identifiable boundaries that integrate terrestrial, aquatic, and geologic processes. Focusing on the whole watershed helps reach the best balance among efforts to control point source pollution and polluted runoff as well as protect drinking water sources and sensitive natural resources such as wetlands (EPA-840-R-98-001).

Four main features are typical of the Watershed Approach: 1) Identifying and prioritizing water quality problems in the watershed, 2) Developing increased public involvement, 3) Coordinating activities with other agencies, and 4) Measuring success through increased and more efficient monitoring and other data gathering.

Typically, the Watershed Approach meets the following description (EPA841-R-95-003):

- Features watersheds or basins as the basic management units
- Targets priority subwatersheds for management action
- Addresses all significant point and nonpoint sources of pollution
- Addresses all significant pollutants
- Sets clear and achievable goals
- Involves the local citizenry in all stages of the program
- Uses the resources and expertise of multiple agencies
- Is not limited by any single agency's responsibilities
- Considers public health issues

An additional characteristic of the Watershed Approach is that it complements other environmental activities. This allows for close cooperation with other state agencies and local governments as well as with federal agencies such as the Tennessee Valley Authority and the U.S. Army Corps of Engineers, U.S. Department of Agriculture (*e.g.*, Natural Resources Conservation Service, United States Forest Service), U.S. Department of the Interior (*e.g.* United States Geological Survey, U.S. Fish and Wildlife Service, National Park Service). When all permitted dischargers are considered together, agencies are better able to focus on those controls necessary to produce measurable improvements in water quality. This also results in a more efficient process: It encourages agencies to focus staff and financial resources on prioritized geographic locations and makes it easier to coordinate between agencies and individuals with an interest in solving water quality problems (EPA841-R-003).

The Watershed Approach is not a regulatory program or a new EPA mandate; rather it is a decision making process that reflects a common strategy for information collection and analysis as well as a common understanding of the roles, priorities, and responsibilities of all stakeholders within a watershed. The Watershed Approach utilizes features already in state and federal law, including:

- Water Quality Standards
- National Pollutant Discharge Elimination System (NPDES)
- Total Maximum Daily Loads (TMDLs)
- Clean Lakes Program
- Nonpoint Source Program
- Groundwater Protection

Traditional activities like permitting, planning, and monitoring are also coordinated in the Watershed Approach. A significant change from the past, however, is that the Watershed Approach encourages integration of traditional regulatory (point source pollution) and nonregulatory (nonpoint sources of pollution) programs. There are additional changes from the past as well:

THE PAST	WATERSHED APPROACH
Focus on fixed-station ambient monitoring	Focus on comprehensive watershed monitoring
Focus on pollutant discharge sites	Focus on watershed-wide effects
Focus on WPC programs	Focus on coordination and cooperation
Focus on point sources of pollution	Focus on all sources of pollution
Focus on dischargers as the problem	Focus on dischargers as an integral part of the solution
Focus on short-term problems	Focus on long-term solutions

Table 1-1. Contrast Between the Watershed Approach and the Past.

This approach places greater emphasis on all aspects of water quality, including chemical water quality (conventional pollutants, toxic pollutants), physical water quality (temperature, flow), habitat quality (channel morphology, composition and health of benthic communities), and biodiversity (species abundance, species richness).

1.2.A. Components of the Watershed Approach. Tennessee is composed of fifty-five watersheds corresponding to the 8-digit USGS Hydrologic Unit Codes (HUC-8). These watersheds, which serve as geographic management units, are combined in five groups according to year of implementation.

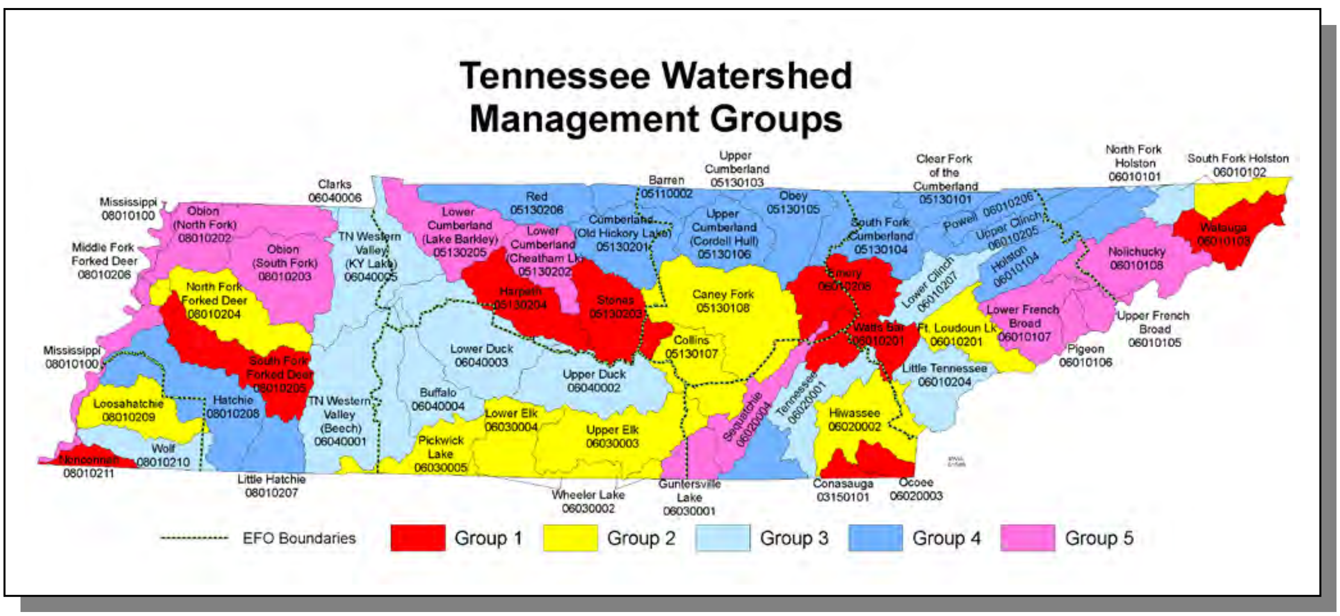


Figure 1-1. Watershed Groups in Tennessee's Watershed Approach to Water Quality.

Each year, TDEC conducts monitoring in one-fifth of Tennessee's watersheds; assessment, priority setting and follow-up monitoring are conducted in another one fifth of watersheds; modeling and TMDL studies in another one fifth; developing management plans in another one fifth; and implementing management plans in another one fifth of watersheds.

GROUP	WEST TENNESSEE	MIDDLE TENNESSEE	EAST TENNESSEE
1	Nonconnah South Fork Forked Deer	Harpeth Stones	Conasauga Emory Ocoee Watauga Watts Bar
2	Loosahatchie Middle Fork Forked Deer North Fork Forked Deer	Caney Fork Collins Lower Elk Pickwick Lake Upper Elk Wheeler Lake	Fort Loudoun Hiwassee South Fork Holston (Upper) Wheeler Lake
3	Tennessee Western Valley (Beech River) Tennessee Western Valley (KY Lake) Wolf River	Buffalo Lower Duck Upper Duck	Little Tennessee Lower Clinch North Fork Holston South Fork Holston (Lower) Tennessee (Upper)
4	Lower Hatchie Upper Hatchie	Barren Obey Red Upper Cumberland (Cordell Hull Lake) Upper Cumberland (Old Hickory Lake) Upper Cumberland (Cumberland Lake)	Holston Powell South Fork Cumberland Tennessee (Lower) Upper Clinch Upper Cumberland (Clear Fork)
5	Mississippi North Fork Obion South Fork Obion	Guntersville Lake Lower Cumberland (Cheatham Lake) Lower Cumberland (Lake Barkley)	Lower French Broad Nolichucky Pigeon Upper French Broad

Table 1-2. Watershed Groups in Tennessee's Watershed Approach.

In succeeding years of the cycle, efforts rotate among the watershed groups. The activities in the five year cycle provide a reference for all stakeholders.

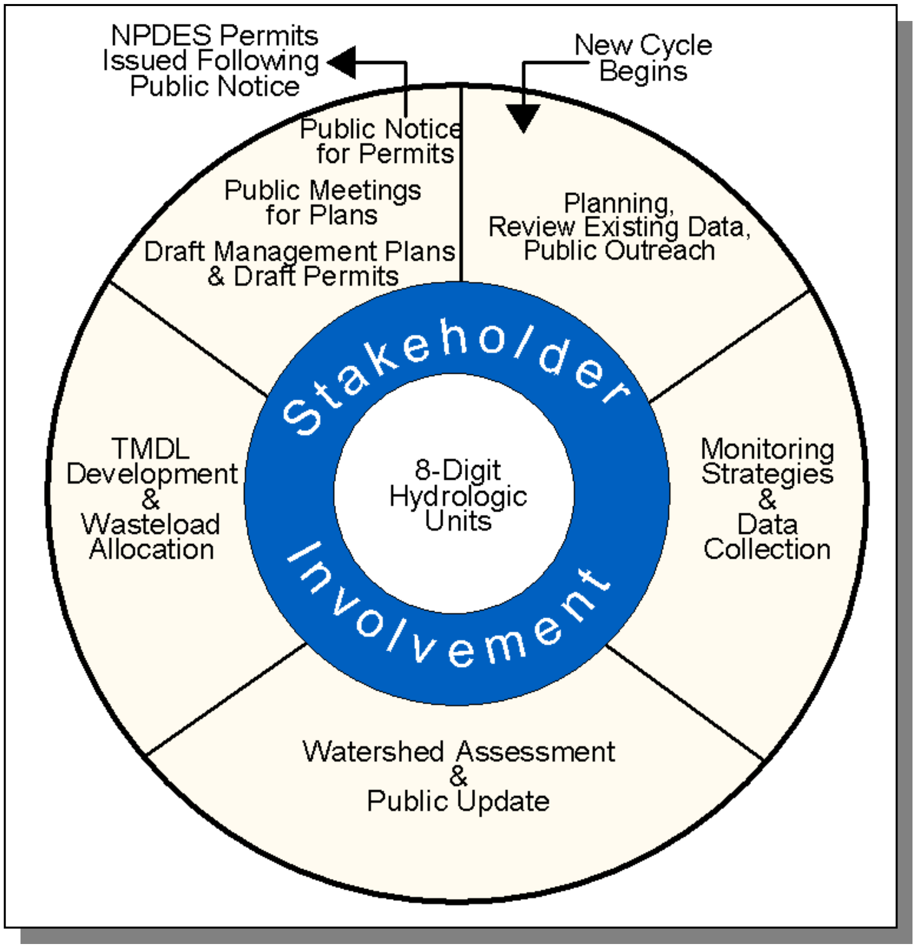


Figure 1-2. The Watershed Approach Cycle.

The six key activities that take place during the cycle are:

1. Planning and Existing Data Review. Existing data and reports from appropriate agencies and organizations are compiled and used to describe the current conditions and status of rivers and streams. Reviewing all existing data and comparing agencies' work plans guide the development of an effective monitoring strategy.

2. Monitoring. Field data is collected for streams in the watershed. These data supplement existing data and are used for the water quality assessment.

3. Assessment. Monitoring data are used to determine the status of the stream's designated use supports.

4. Wasteload Allocation/TMDL Development. Monitoring data are used to determine nonpoint source contributions and pollutant loads for permitted dischargers releasing wastewater to the watershed. Limits are set to assure that water quality is protected.

5. Permits. Issuance and expiration of all discharge permits are synchronized based on watersheds. Currently, 1700 permits have been issued in Tennessee under the federally delegated National Pollutant Discharge Elimination System (NPDES).

6. Watershed Management Plans. These plans include information for each watershed including general watershed description, water quality goals, major water quality concerns and issues, and management strategies.

Public participation opportunities occur throughout the entire five year cycle. Participation in Years 1, 3 and 5 is emphasized, although additional meetings are held at stakeholder's request. People tend to participate more readily and actively in protecting the quality of waters in areas where they live and work, and have some roles and responsibilities:

- Data sharing
- Identification of water quality stressors
- Participation in public meetings
- Commenting on management plans
- Shared commitment for plan implementation

1.2.B. Benefits of the Watershed Approach. The Watershed Approach fosters a better understanding of the physical, chemical and biological effects on a watershed, thereby allowing agencies and citizens to focus on those solutions most likely to be effective. The Approach recognizes the need for a comprehensive, ecosystem-based approach that depends on local governments and local citizens for success (EPA841-R-95-004). On a larger scale, many lessons integrating public participation with aquatic ecosystem-based programs have been learned in the successful Chesapeake Bay, Great Lakes, Clean Lakes, and National Estuary Programs.

Benefits of the Watershed Approach include (EPA841-R-95-004):

- Focus on water quality goals and ecological integrity rather than on program activities such as number of permits issued.

- Improve basis for management decisions through consideration of both point and nonpoint source stressors. A watershed strategy improves the scientific basis for decision making and focuses management efforts on basins and watersheds where they are most needed. Both point and nonpoint control strategies are more effective under a watershed approach because the Approach promotes timely and focused development of TMDLs.

- Enhance program efficiency, as the focus becomes watershed. A watershed focus can improve the efficiency of water management programs by facilitating consolidation of programs within each watershed. For example, handling all point source dischargers in a watershed at the same time reduces administrative costs due to the potential to combine hearings and notices as well as allowing staff to focus on more limited areas in a sequential fashion.

- Improve coordination between federal, state and local agencies including data sharing and pooling of resources. As the focus shifts to watersheds, agencies are better able to participate in data sharing and coordinated assessment and control strategies.

- Increase public involvement. The Watershed Approach provides opportunities for stakeholders to increase their awareness of water-related issues and inform staff about their knowledge of the watershed. Participation is via three public meetings over the five-year watershed management cycle as well as meetings at stakeholder’s request. Additional opportunities are provided through the Department of Environment and Conservation homepage and direct contact with local Environmental Assistance Centers.

- Greater consistency and responsiveness. Developing goals and management plans for a basin or watershed with stakeholder involvement results in increased responsiveness to the public and consistency in determining management actions. In return, stakeholders can expect improved consistency and continuity in decisions when management actions follow a watershed plan.

Additional benefits of working at the watershed level are described in the Clean Water Action Plan (EPA-840-R-98-001), and can be viewed at http://www.cleanwater.gov/action/toc.html.

The Watershed Approach represents awareness that restoring and maintaining our waters requires crossing traditional barriers (point *vs.* nonpoint sources of pollution) when designing solutions. These solutions increasingly rely on participation by both public and private sectors, where citizens, elected officials and technical personnel all have opportunity to participate. This integrated approach mirrors the complicated relationships in which people live, work and recreate in the watershed, and suggests a comprehensive, watershed-based and community-based approach is needed to address these (EPA841-R-97-005).

CHAPTER 2

DESCRIPTION OF THE SOUTH FORK CUMBERLAND RIVER WATERSHED

2.1. BACKGROUND. The South Fork Cumberland River Watershed, also referred to as the Big South Fork Watershed, is named after a prominent river in the watershed. The watershed features a park spanning Tennessee and Kentucky, the Big South Fork National River and Recreation Area, administered by the National Park Service.

The Big South Fork of the Cumberland River is a major drainage feature of the Cumberland Plateau, a major tributary of the Cumberland system, a world-class whitewater canoeing and kayaking stream.

The Big South Fork is formed by the confluence of the New River and the Clear Fork River at the southern end of the Big South Fork National Recreation Area. From here, the river runs roughly north. This area is extremely remote. The river flows through a deep gorge which has been eroded through sandstone. Many rapids features have names by which they are well known in the whitewater community.

This Chapter describes the location and characteristics of the South Fork Cumberland River Watershed.

2.2. DESCRIPTION OF THE WATERSHED.

2.2.A. General Location. The Tennessee portion of the South Fork Cumberland River Watershed is located in East Tennessee and includes parts of Anderson, Campbell, Fentress, Morgan, Pickett, and Scott Counties.

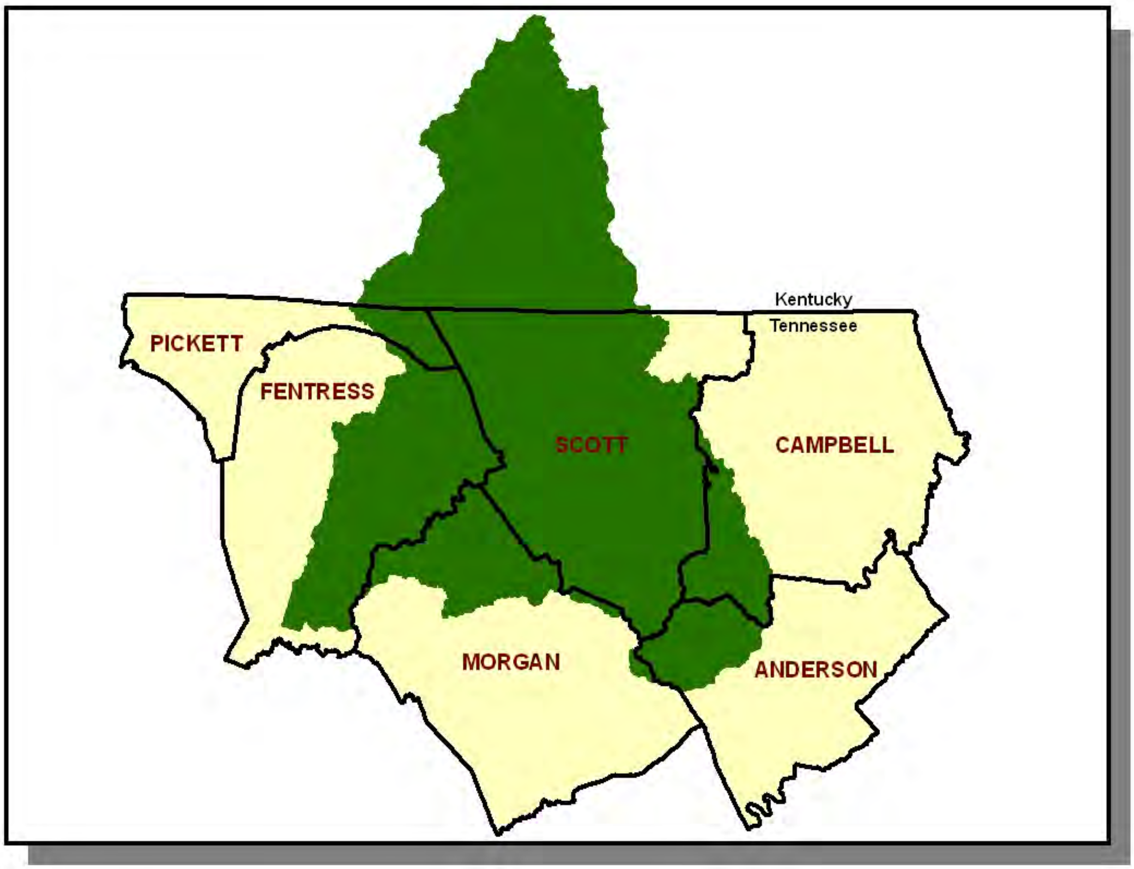


Figure 2-1. General Location of the South Fork Cumberland River Watershed.

COUNTY	% OF WATERSHED IN EACH COUNTY
Scott	49.4
Fentress	23.5
Morgan	11.1
Campbell	6.7
Anderson	6.5
Pickett	2.8

Table 2-1. The South Fork Cumberland River Watershed Includes Parts of Six East Tennessee Counties.

2.2.B. Population Density Centers. Eight highways serve the major communities in the Tennessee portion of the South Fork Cumberland River Watershed.

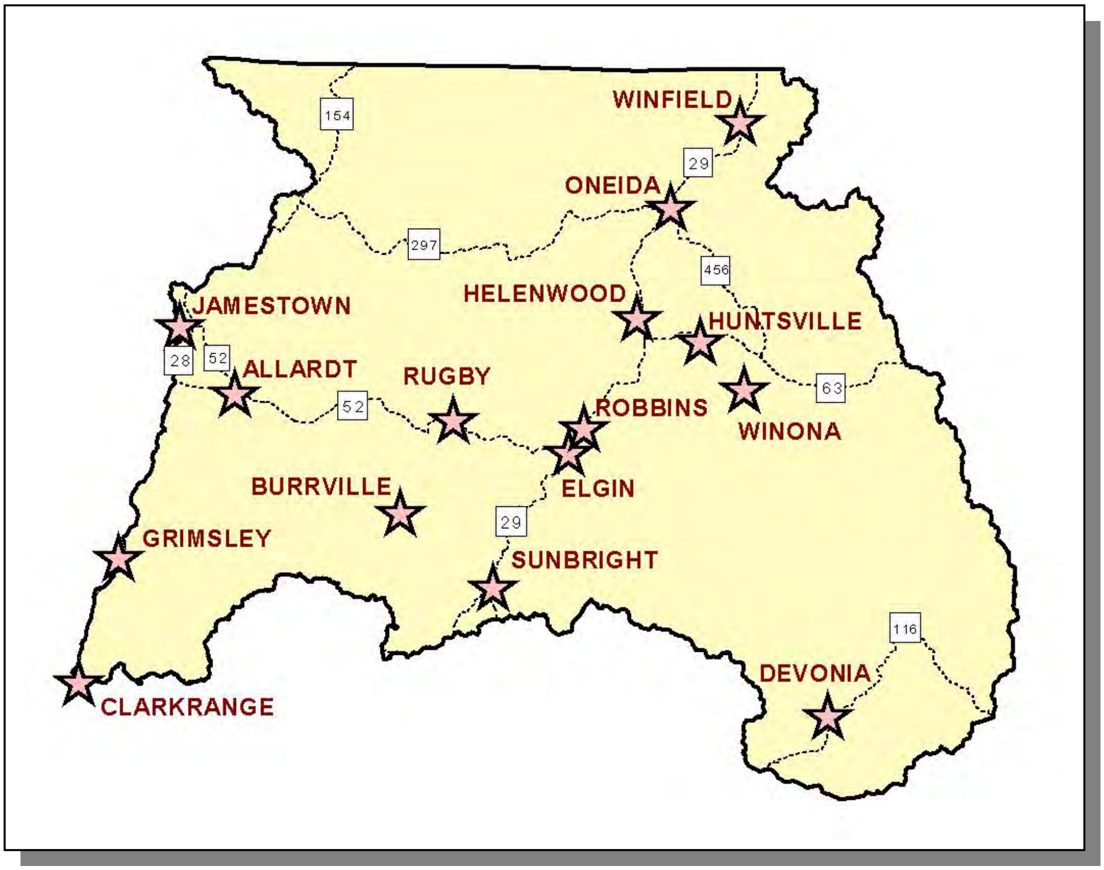


Figure 2-2. Communities and Roads in the Tennessee Portion of the South Fork Cumberland River Watershed.

MUNICIPALITY	POPULATION	COUNTY
Oneida	3,615	Oneida
Jamestown*	1,839	Fentress
Huntsville*	1,116	Scott
Winfield	911	Scott
Helenwood	846	Scott
Allardt	642	Fentress
Sunbright	577	Morgan
Elgin	229	Scott

Table 2-2. Municipalities in the Tennessee Portion of the South Fork Cumberland River Watershed. *Population based on 2000 census (Tennessee Blue Book) or http://www.hometownlocator.com. Asterisk (*) indicates county seat.*

2.3. GENERAL HYDROLOGIC DESCRIPTION.

2.3.A. Hydrology. The South Fork Cumberland River Watershed, designated 05130104 by the USGS, is approximately 1,365 square miles (976 square miles in Tennessee) and drains to the Cumberland River.

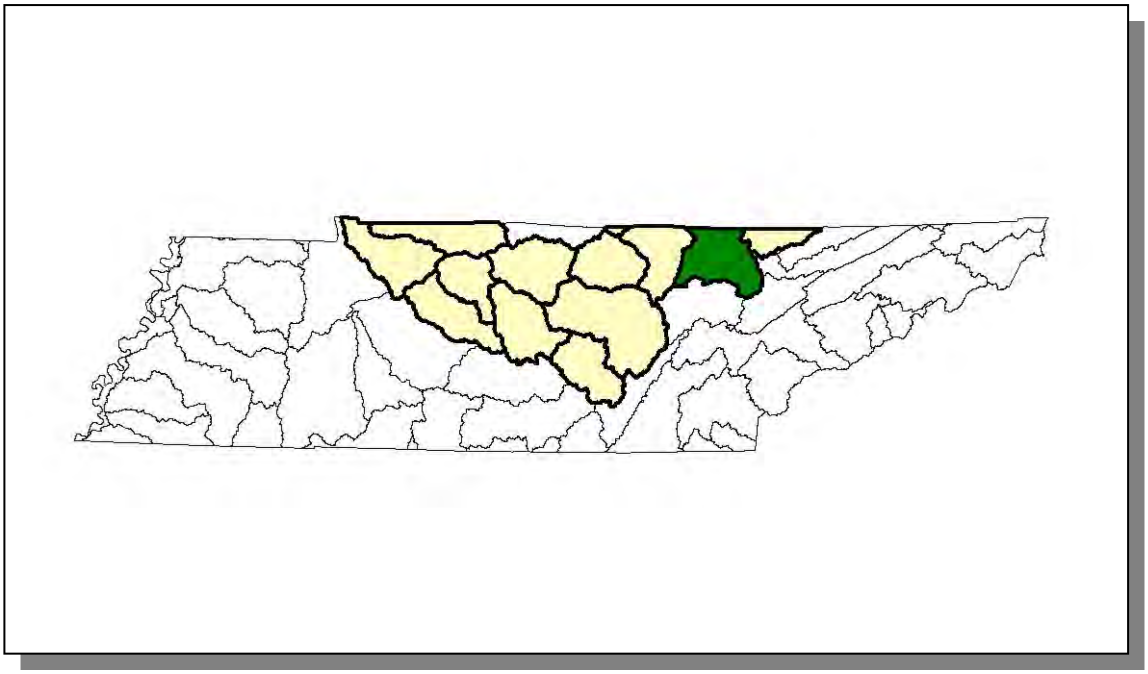


Figure 2-3. The South Fork Cumberland River Watershed is Part of the Cumberland River Basin.

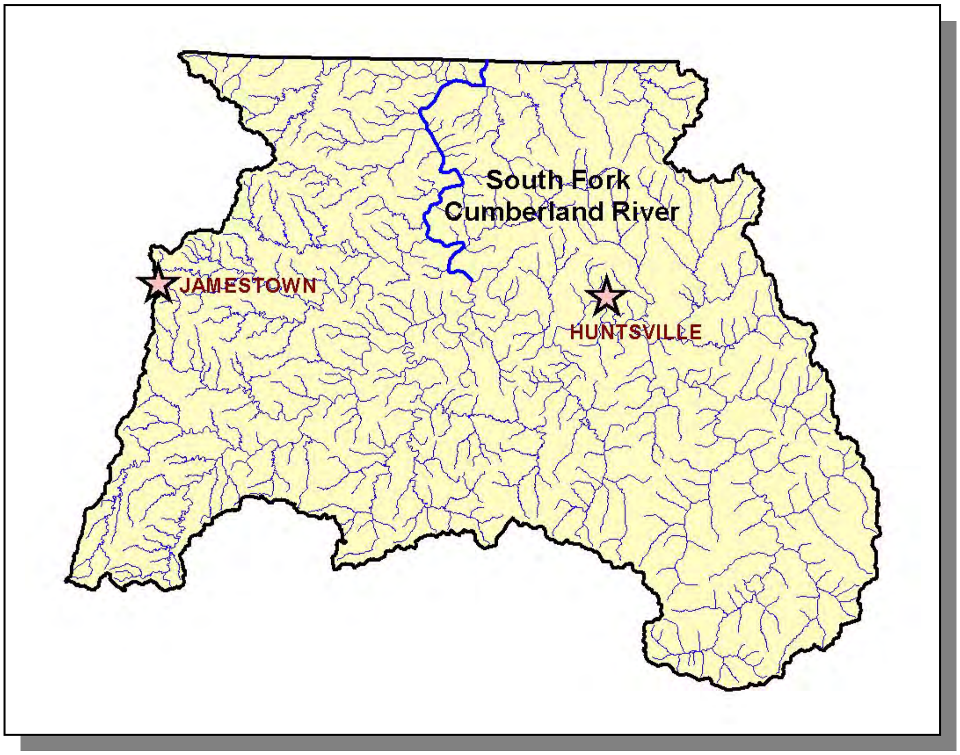


Figure 2-4. Hydrology in the Tennessee Portion of the South Fork Cumberland River Watershed. *There are 1,378.0 stream miles and 5 lake acres recorded in River Reach File 3 in the Tennessee portion of the South Fork Cumberland River Watershed. Location of the South Fork Cumberland River and the cities of Huntsville and Jamestown are shown for reference.*

2.3.B. Dams. There are 24 dams inventoried by TDEC Division of Water Supply in the Tennessee portion of the South Fork Cumberland River Watershed. These dams either retain 30 acre-feet of water or have structures at least 20 feet high.

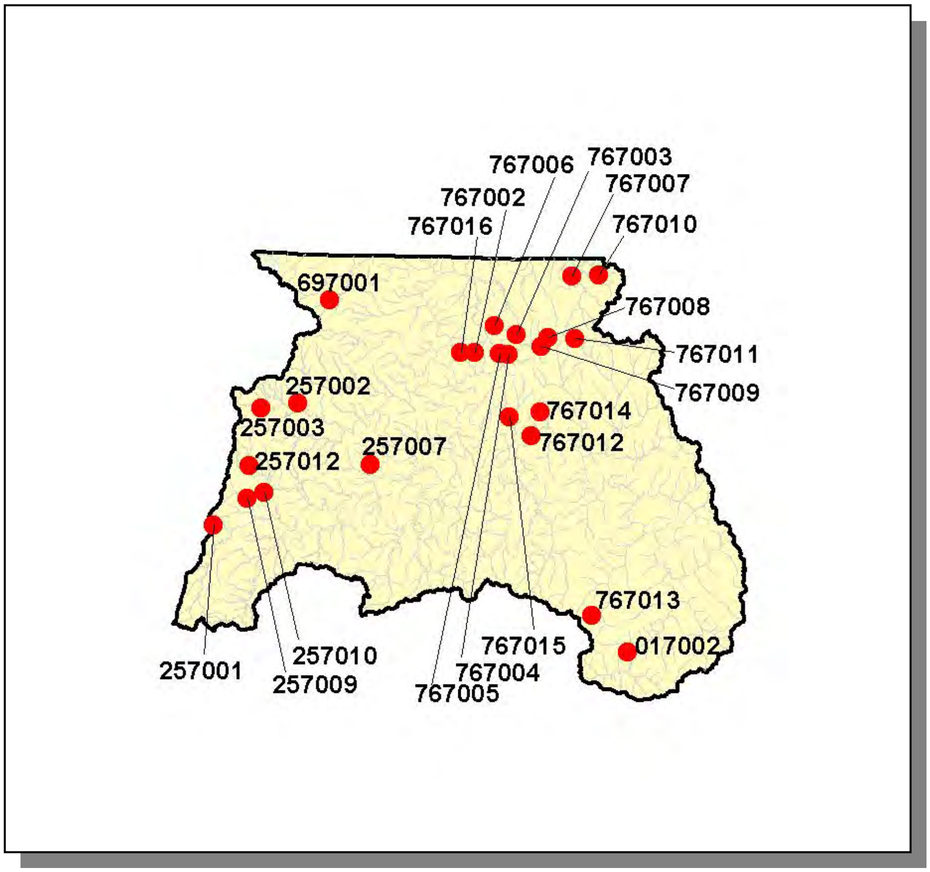


Figure 2-5. Location of Inventoried Dams in the Tennessee Portion of the South Fork Cumberland River Watershed. *More information, including identification of inventoried dams labeled, is provided in Appendix II and at http://gwidc.memphis.edu/website/dams/viewer.htm.*

2.4. LAND USE. Land Use/Land Cover information was provided by EPA Region 4 and was interpreted from 1992 Multi-Resolution Land Cover (MRLC) satellite imagery.

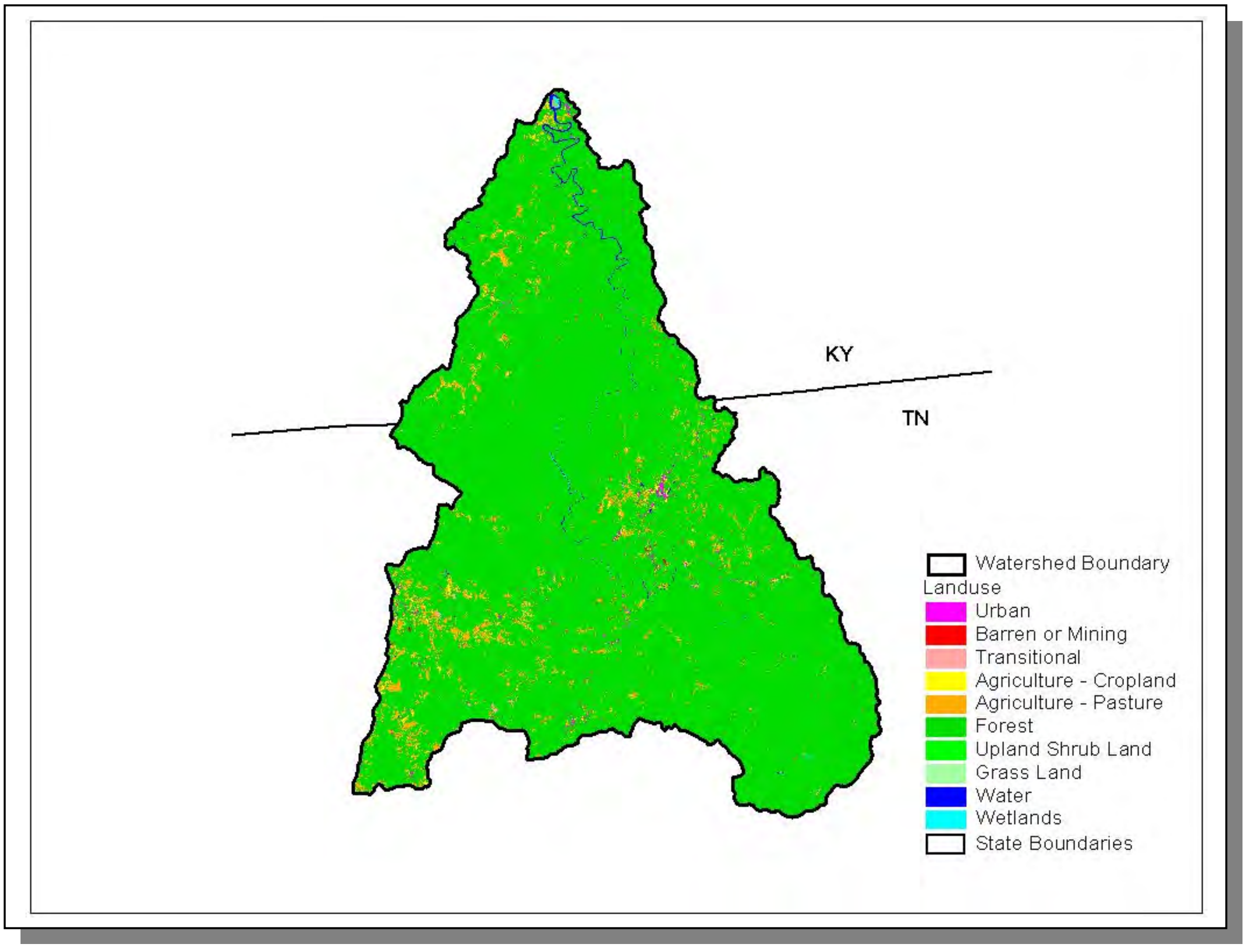


Figure 2-6. Illustration of Select Land Cover/Land Use Data from MRLC Satellite Imagery.

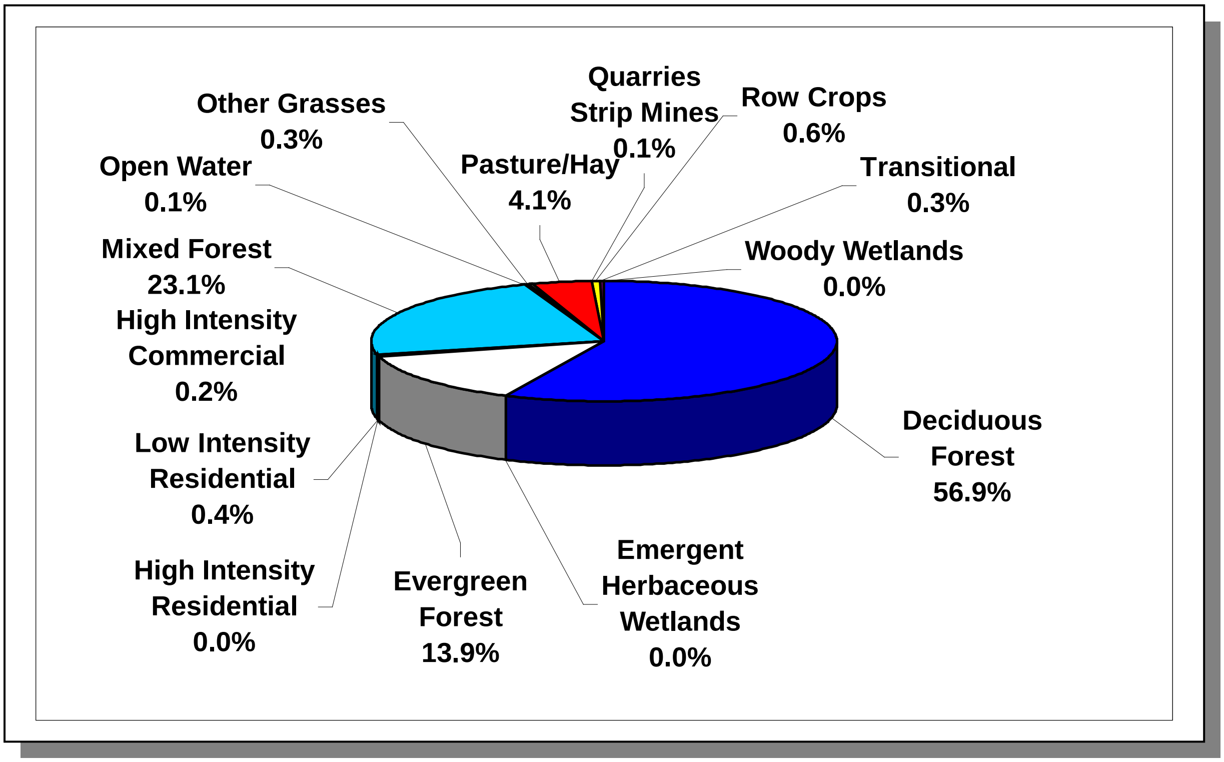


Figure 2-7. Land Use Distribution in the Tennessee Portion of the South Fork Cumberland River Watershed. *More information is provided in Appendix II.*

Sinkholes, springs, disappearing streams and caves characterize karst topography. The term "karst" describes a distinctive landform that indicates dissolution of underlying soluble rocks by surface water or ground water. Although commonly associated with limestone and dolomite (carbonate rocks), other highly soluble rocks such as gypsum and rock salt can be sculpted into karst terrain. In karst areas, the ground water flows through solution-enlarged channels, bedding planes and microfractures within the rock. The characteristic landforms of karst regions are: closed depressions of various size and arrangement; disrupted surface drainage; and caves and underground drainage systems. The term "karst" is named after a famous region in the former country of Yugoslavia.

Figure 2-8. Illustration of Karst Areas in the Tennessee Portion of the South Fork Cumberland River Watershed. *Locations of communities in the watershed are shown for reference.*

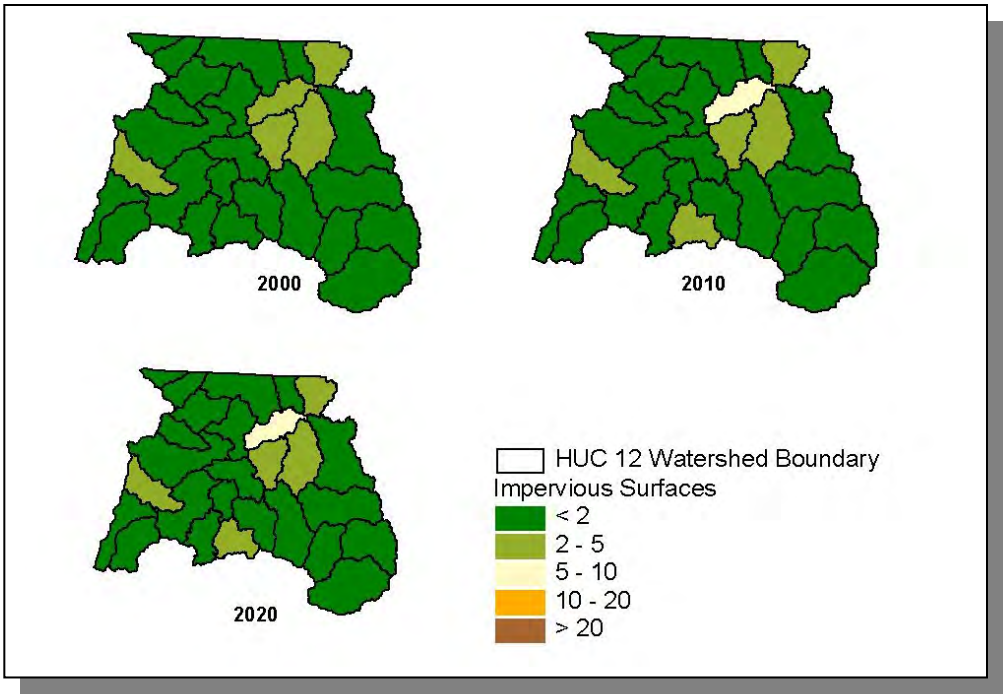


Figure 2-9. Illustration of Total Impervious Area in the Tennessee Portion of the South Fork Cumberland River Watershed. *All HUC-12 subwatersheds are shown. Current and projected total impervious cover (percent of total area) is provided by EPA Region 4. More information can be found at: http://www.epa.gov/ATHENS/research/impervious/*

2.5. ECOREGIONS AND REFERENCE STREAMS. Ecoregions are relatively homogeneous areas of similar geography, topography, climate and soils that support similar plant and animal life. Ecoregions serve as a spatial framework for the assessment, management, and monitoring of ecosystems and ecosystem components. Ecoregion studies can aid the selection of regional stream reference sites, identifying high quality waters, and developing ecoregion-specific chemical and biological water quality criteria.

There are eight Level III Ecoregions and twenty-five Level IV subecoregions in Tennessee. The Tennessee portion of the South Fork Cumberland River Watershed lies within 2 Level III ecoregions (Southwestern Appalachians and Central Appalachians) and contains 3 Level IV subecoregions:

- The **Cumberland Plateau (68a)** tablelands and open low mountains are about 1000 feet higher than to the west, and receive slightly more precipitation with cooler annual temperatures than the surrounding lower-elevation ecoregions. The plateau surface is less dissected with lower relief compared to the Cumberland Mountains or the Plateau Escarpment (68c). Elevations are generally 1200-2000 feet, with the Crab Orchard Mountains reaching over 3000 feet. Pennsylvania-age conglomerate, sandstone, siltstone, and shale is covered by mostly well-drained, acidic soils of low fertility. The region is forested, with some agriculture and coal mining activities.

- The **Plateau Escarpment (68c)** is characterized by steep, forested slopes and high velocity, high gradient streams. Local relief is often 1000 feet or more. The geologic strata include Mississippian-age limestone, sandstone, shale, and siltstone, and Pennsylvania-age shale, siltstone, sandstone, and conglomerate. Streams have cut down into the limestone, but the gorge talus slopes are composed of colluvium with huge angular, slabby blocks of sandstone. Vegetation community types in the ravines and gorges include mixed oak and chestnut oak on the upper slopes, more mesic forests on the middle and lower slopes (beech-tulip poplar, sugar maple-basswood-ash-buckeye), with hemlock along rocky streamsides and river birch along floodplain terraces.

- The **Cumberland Mountains (69d)**, in contrast to the sandstone-dominated Cumberland Plateau (68a) to the west and southwest, are more highly dissected, with narrow-crested steep slopes, and younger Pennsylvanian-age shales, sandstones, siltstones, and coal. Narrow, winding valleys separate the mountain ridges, and relief is often 2000 feet. Cross Mountain, west of Lake City, reaches 3534 feet in elevation. Soils are generally well-drained, loamy, and acidic, with low fertility. The natural vegetation is a mixed mesophytic forest, although composition and abundance vary greatly depending on aspect, slope position, and degree of shading from adjacent land masses. Large tracts of land are owned by lumber and coal companies, and there are many areas of stripmining.

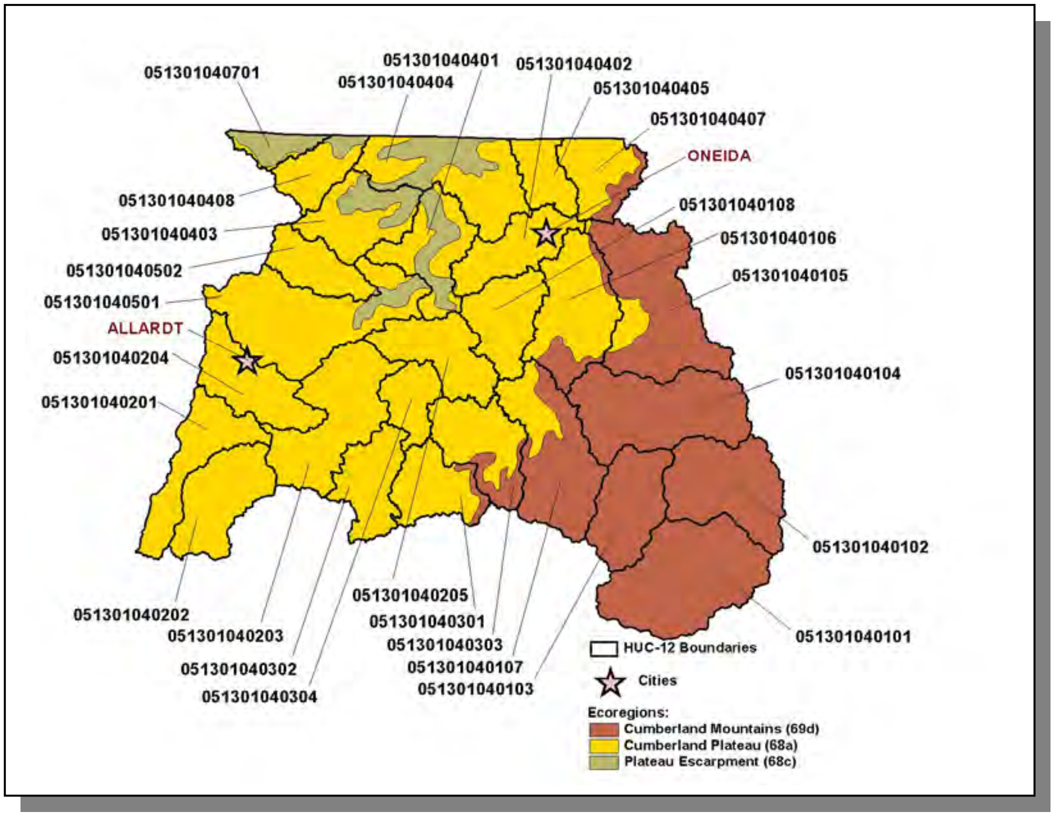


Figure 2-10. Level IV Ecoregions in the Tennessee Portion of the South Fork Cumberland River Watershed. *HUC-12 subwatershed boundaries and locations Allardt and Oneida are shown for reference.*

Each Level IV Ecoregion has at least one reference stream associated with it. A reference stream represents a least impacted condition and may not be representative of a pristine condition.

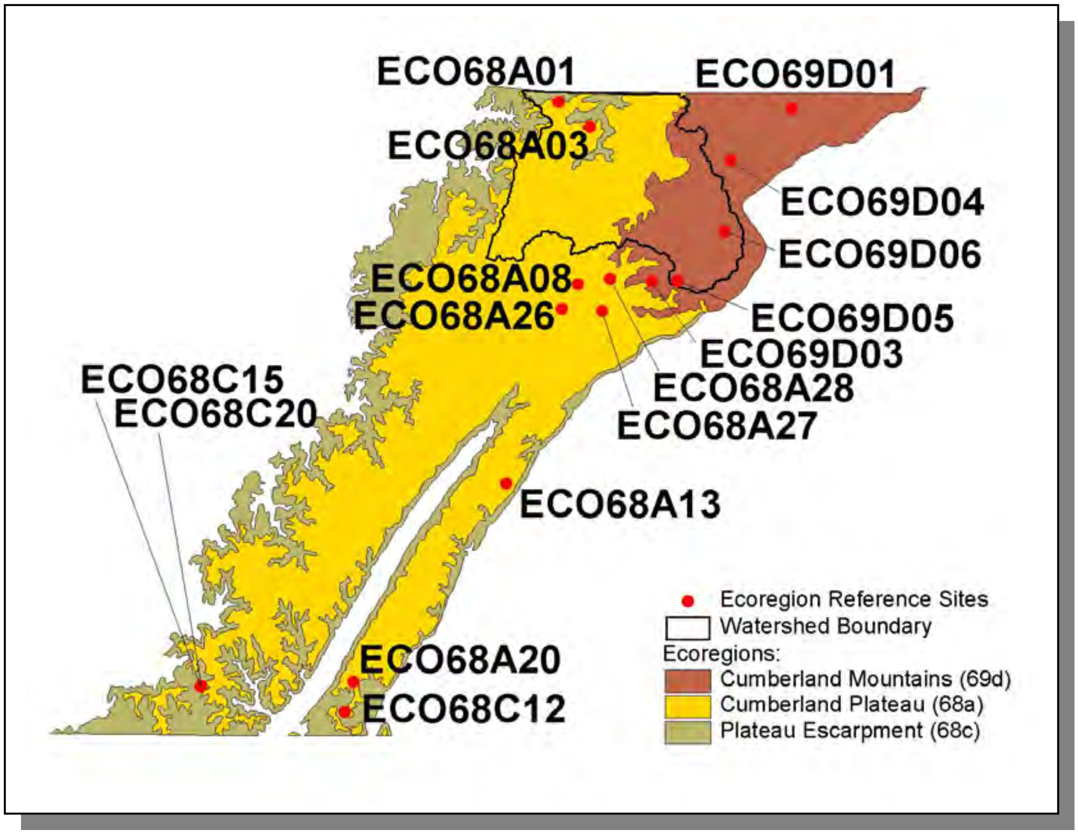


Figure 2-11. Ecoregion Monitoring Sites in Level IV Ecoregions 68a, 68c, and 69d. *The Tennessee portion of the South Fork Cumberland River Watershed is shown for reference. More information, including which ecoregion reference sites were inactive or dropped prior to 01/01/2006, is provided in Appendix II.*

2.6. NATURAL RESOURCES.

2.6.A. Designated State Natural Area. The Natural Areas Program was established in 1971 with the passage of the Natural Areas Preservation Act. TDEC/Division of Natural Heritage administers the State Natural Areas program. Further information may be found at http://www.state.tn.us/environment/na/.

The Tennessee portion of the South Fork Cumberland River Watershed has four Designated State Natural Area:

Colditz Cove Class II Natural-Scientific State Natural Area is a 165-acre natural area located approximately 2 miles east of Allardt, Tennessee in Fentress County. Its most impressive feature is Northrup Falls, which plunges more than 60 feet over a protruding rock ledge into a scenic, narrow, gorge along Big Branch Creek. The waterfall is named for the family who settled here and operated a mill above the falls in the 1800's. These high cliffs and "rock houses" (cave-like overhangs) at the falls and along the creek gorge, were once used by cliff-dwelling Woodland Indians over 3,000 years ago for shelter while hunting.

Frozen Head Class I Scenic-Recreational State Natural Area and Class II Natural Scientific State Natural Area is an 11,320-acre natural area in Morgan County. It is one of the crown jewels of Tennessee's Cumberland Mountain range and is an excellent example of what presettlement conditions might have been like here hundreds of years ago. The Cumberland Mountains occupy the northeast section of the Cumberland Plateau and has an elevation range that rises more than 1,000 feet above the Plateau. The highest peak in the natural area occurs on Frozen Head Mountain at 3,324 feet elevation. There are thirteen other peaks in the natural area rising above 3,000 feet elevation. The name "Frozen Head" derives from the peaks that are often capped in a shroud of snow or ice in winter. The majority of this land was acquired by the State in early 1900's to become a state forest for hardwood timber production, but very little timber was ever harvested.

Honey Creek Pocket Wilderness Class II Natural-Scientific State Natural Area is a 109-acre natural area in Pickett County. It is one of two designated state natural areas located in the Big South Fork National River and Recreation Area (BSFNRRA) owned and managed by the National Park Service. It was previously a Bowater Pocket Wilderness Area before the BSFNRRA was established. One of its most outstanding features is the incredibly scenic overlook 250 feet above the South Fork of Cumberland River.

Twin Arches Class II Natural-Scientific State Natural Area is approximately 1,500 acres located in Scott and Pickett Counties and contains two impressive geological formations known as the Twin Arches. These arches form the largest natural bridge complex known in Tennessee and represent one of the world's largest such complexes. The two sandstone arches are situated end-to-end, and are commonly referred to as the North and South Arches.

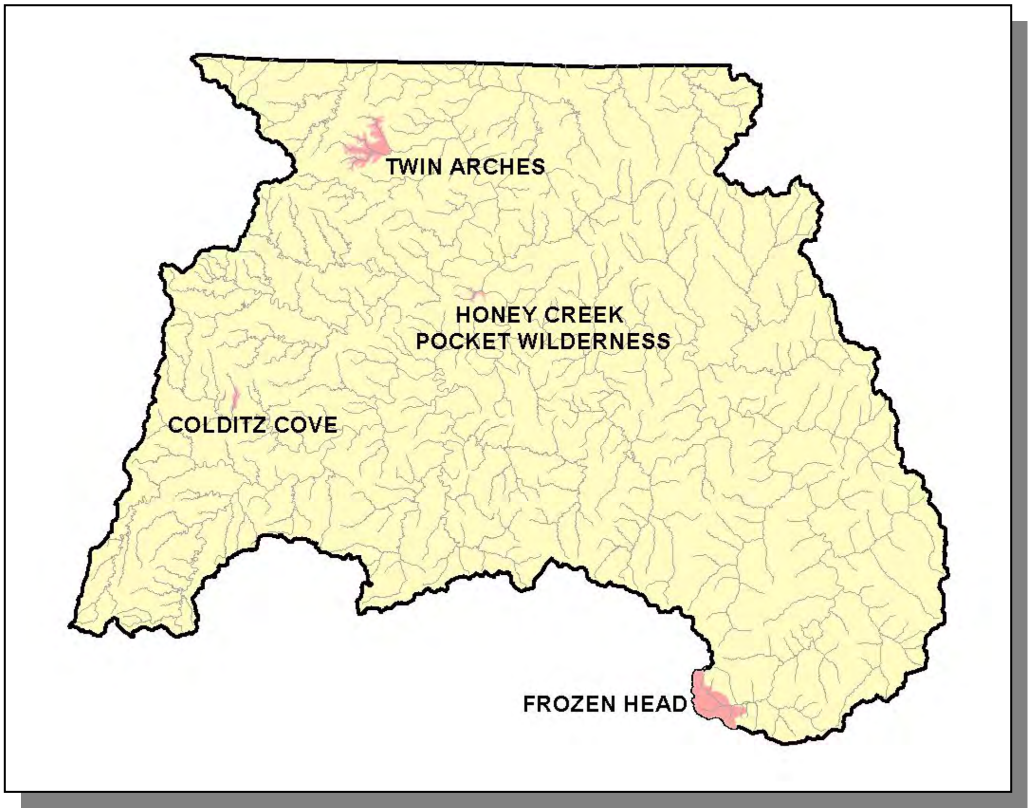


Figure 2-12. There are Four Designated State Natural Areas in the Tennessee Portion of the South Fork Cumberland River Watershed.

2.6.B. Rare Plants and Animals. The Heritage Program in the TDEC Division of Natural Heritage maintains a database of rare species that is shared by partners at The Nature Conservancy, Tennessee Wildlife Resources Agency, the US Fish and Wildlife Service, and the Tennessee Valley Authority. The information is used to: 1) track the occurrence of rare species in order to accomplish the goals of site conservation planning and protection of biological diversity, 2) identify the need for, and status of, recovery plans, and 3) conduct environmental reviews in compliance with the federal Endangered Species Act.

GROUPING	NUMBER OF RARE SPECIES
Crustaceans	3
Mussels	5
Amphibians	5
Birds	4
Fish	8
Mammals	8
Reptiles	2
Plants	53
Total	**88**

Table 2-3. There are 88 Known Rare Plant and Animal Species in the Tennessee Portion of the South Fork Cumberland River Watershed.

In the Tennessee portion of the South Fork Cumberland River Watershed, there are eight known rare fish species, five known rare mussel species, and three known rare crustacean species.

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS
Ammocrypta asprella	Crystal darter		D
Etheostoma baileyi	Emerald darter		D
Eheostoma cinereum	Ashy darter		T
Etheostoma percnurum	Duskytail darter	LE	E
Eheostoma sagitta	Arrow darter		D
Etheostoma tippecanoe	Tippicanoe darter		D
Percina squamata	Olive darter		D
Phoxinus cumberlandensis	Blackside dace	LT	T
Alasmidonta atropurpurea	Cumberland elktoe	LE	E
Epioblasma brevidens	Cumberland combshell	LE	E
Epioblasma florentina walkeri	Tan riffleshell	LE	E
Pegios fibula	Little-wing pearlymussel	LE	E
Villosa trabalis	Cumberland bean	LE	E
Cambarus bouchardi	Big South Fork crayfish		E
Cambarus crinipes	Bouchard's crayfish		
Orconectes australis	A crayfish		

Table 2-4. Rare Aquatic Species in the Tennessee Portion of the South Fork Cumberland River Watershed. *Federal Status: LE, Listed Endangered by the U.S. Fish and Wildlife Service; LT, Listed Threatened by the U.S. Fish and Wildlife Service. State Status: T, Listed Threatened by the Tennessee Wildlife Resources Agency; E, Listed Endangered by the Tennessee Wildlife Resources Agency; D, Deemed in Need of Management by the Tennessee Wildlife Resources Agency. More information may be found at http://www.state.tn.us/environment/na/.*

2.6.C. Wetlands. The Division of Natural Areas maintains a database of wetland records in Tennessee. These records are a compilation of field data from wetland sites inventoried by various state and federal agencies. Maintaining this database is part of Tennessee's Wetland Strategy, which is described at:

http://www.state.tn.us/environment/na/wetlands/

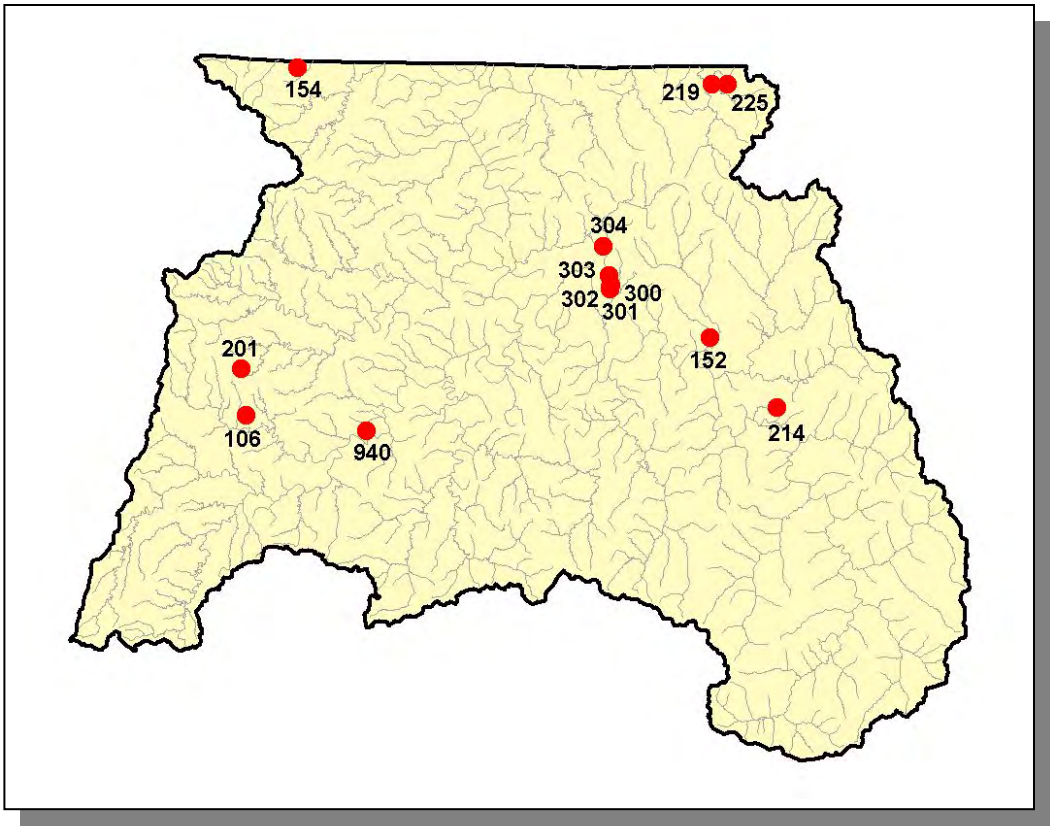


Figure 2-13. Location of Wetland Sites in TDEC Division of Natural Heritage Database in Tennessee Portion of the South Fork Cumberland River Watershed. This map represents an incomplete inventory and should not be considered a dependable indicator of the presence of wetlands. *There may be additional wetland sites in the watershed. More information, including identification of wetland sites labeled, is provided in Appendix II.*

2.7. CULTURAL RESOURCES.

2.7.A. Nationwide Rivers Inventory. The Nationwide Rivers Inventory, required under the Federal Wild and Scenic Rivers Act of 1968, is a listing of free-flowing rivers that are believed to possess one or more outstanding natural or cultural values. Exceptional scenery, fishing or boating, unusual geologic formations, rare plant and animal life, cultural or historic artifacts that are judged to be of more than local or regional significance are the values that qualify a river segment for listing. The Tennessee Department of Environment and Conservation and the Rivers and Trails Conservation Assistance branch of the National Park Service jointly compile the Nationwide Rivers Inventory from time to time (most recently in 1997). Under a 1980 directive from the President's Council on Environmental Quality, all Federal agencies must seek to avoid or mitigate actions that would have an adverse effect on Nationwide Rivers Inventory segments.

The most recent version of the Nationwide Rivers Inventory lists portions of eight streams in the Tennessee portion of the South Fork Cumberland River Watershed:

> Big South Fork Cumberland River (RM 55 to RM 76) is an outstanding popular white water, rugged, forested area with highly scenic values and numerous archaeological sites.
>
> Clear Fork of South Fork Cumberland River, including North Prong (RM 0 to RM 44) is a scenic stream with close steep valley walls, long pools, moderate rapids, and short, quick drops.
>
> Crooked Creek (RM 0 to RM 18) flows through the Colditz Cove State Natural Area.
>
> Little South Fork Cumberland River (RM 32 to RM 34) is a forested, highly scenic and sparsely developed stream with deep channels with large boulders and rock ledges.
>
> New River (RM 0 to RM 9) is a placid winding stream that flows through a steep-sided valley with some Class I-III rapids and a gorge area.
>
> North Whiteoak Creek (RM 0 to RM 25) is a rocky, scenic stream with a four hundred foot deep gorge area, moderate white water, and small waterfalls.
>
> Rock Creek (RM 22 to RM 31) is a beautiful stream in wild terrain with deep, narrow valleys and wooded hillsides.
>
> Whiteoak Creek (RM 0 to RM 17) is a scenic float stream of historic significance.

RIVER	SCENIC	RECREATION	GEOLOGIC	FISH	WILDLIFE	HISTORIC	CULTURAL
Big South Fork	X	X	X	X	X	X	X
Clear Fork	X	X	X		X		
Crooked Creek	X	X	X	X	X		
Little South Fork	X	X	X				
New River	X	X	X				
North Whiteoak Creek	X	X	X				
Rock Creek	X	X	X	X	X		
Whiteoak Creek	X	X				X	X

Table 2-5. Attributes of Streams Listed in the Nationwide Rivers Inventory.

Additional information may be found online at http://www.ncrc.nps.gov/rtca/nri/

2.7.B. Outstanding National Resource Waters. Tennessee waters with the highest degree of protection are identified as Outstanding National Resource Waters (ONRW). These waters are specifically designated by the Water Quality Control Board and are listed in Tennessee's Water Quality Standards. No new discharges, expansions of existing discharges, or other regulated activities that would cause degradation may be permitted in these waters.

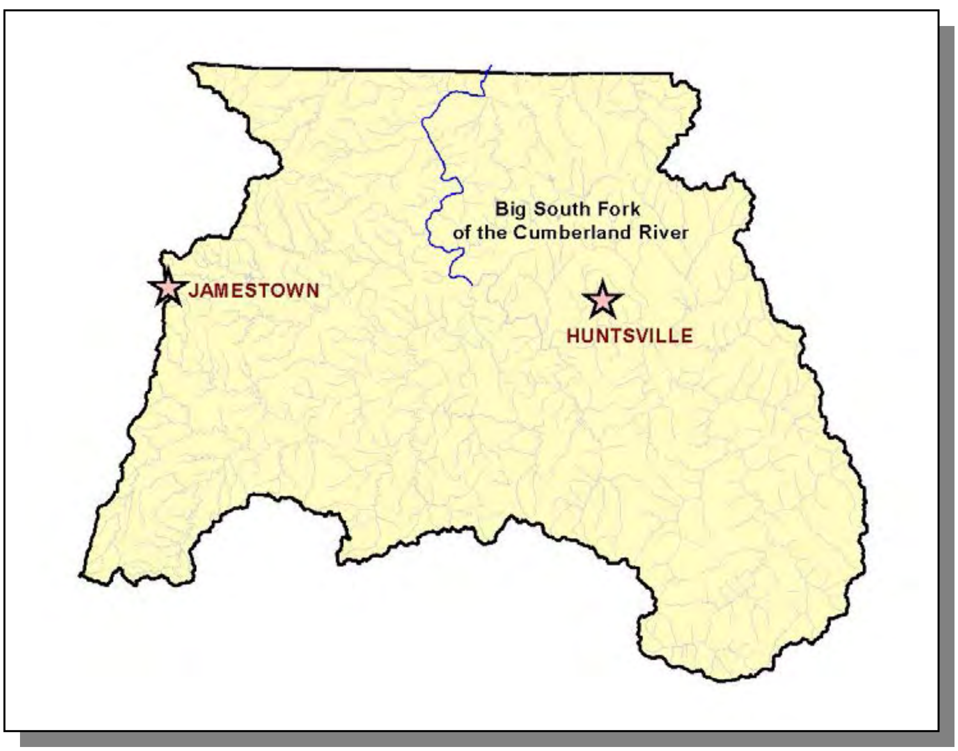


Figure 2-14. The Big South Fork of the Cumberland River Within the Big South Fork National River and Recreation Area has been Designated an Outstanding National Resource Water by the Water Quality Control Board.

2.7.C. Public Lands. Some sites representative of the cultural heritage are under state or federal protection:

- Big South Fork National River and Recreation Area covers 125,000 acres in Tennessee and Kentucky. The U.S. Army Corps of Engineers is charged with land acquisition, planning, and development of the Park, and the National Park Service is responsible for operation and maintenance. More information may be found at http://www.nps.gov/biso/

- Cumberland Forest, established in 1947, is the largest field research unit in the University Forest Resources Research and Education Center. The 8,000-acre forest includes parts of Morgan and Scott Counties. More information may be found at http://forestry.tennessee.edu/Cuforest.html

- Frozen Head State Natural Area is an 11,300-acre natural area in Morgan County. (see Section 2.6.A for more information). More information may be found at http://www.state.tn.us/environment/parks/parks/FrozenHead

- Pickett State Forest is an 18,085-acre tract designated as a state forest in 1935, after the Sterns Coal and Lumber Company donated the land in 1933. More information may be found at http://www.state.tn.us/agriculture/forestry/stateforests/10.html

- Pickett State Park is a 17,372-acre park with uncommon rock formations, natural bridges, numerous caves and signs of ancient Native Americans. More information may be found at http://www.state.tn.us/environment/parks/parks/Pickett/

- Pickett State Forest Wildlife Management Area is an 11,000-acre area managed by TWRA in Pickett County.

- Royal Blue Wildlife Management Area is part of a 50,000-acre wilderness. More information my be found at: http://www.cs.utk.edu/~dunigan/mtnbike/royal.html

- Scott State Forest is a 2,827-acre tract located in Scott and Fentress Counties and is completely surrounded by the Big South Fork National River and Recreation Area. More information may be found at: http://www.state.tn.us/agriculture/forestry/stateforests/11.html

- Sundquist Wildlife Management Area is a 73,000-acre area managed by TWRA in Anderson, Campbell, and Scott Counties.

- Tally Wilderness is located in Pickett County, adjacent to Pickett State Forest. The preserve was donated to The Nature Conservancy as a gift. More information may be found at: http://www.nature.org/wherewework/northamerica/states/tennessee/preserves/art10126.html

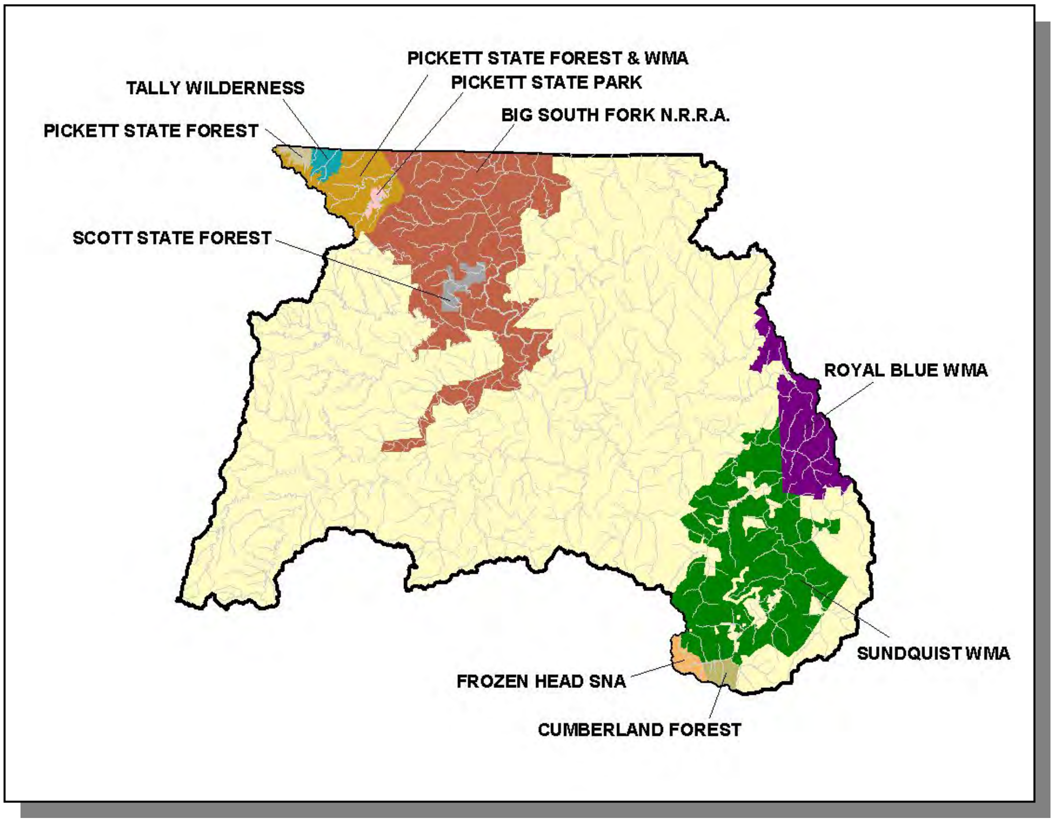


Figure 2-15. Public Lands in the Tennessee Portion of the South Fork Cumberland River Watershed. *Data are from Tennessee Wildlife Resources Agency. NRRA, National River and Recreation Area; SNA, State Natural Area; WMA, Wildlife Management Area.*

2.8. TENNESSEE RIVERS ASSESSMENT PROJECT. The Tennessee Rivers Assessment is part of a national program operating under the guidance of the National Park Service's Rivers and Trails Conservation Assistance Program. The Assessment is an inventory of river resources, and should not be confused with "Assessment" as defined by the Environmental Protection Agency. A more complete description can be found in the Tennessee Rivers Assessment Summary Report, which is available from the Department of Environment and Conservation and on the web at:

http://www.state.tn.us/environment/wpc/publications/riv/

STREAM	NSQ	RB	RF	STREAM	NSQ	RB	RF
Beech Fork Creek	2			New River	1,2	1,2	4
Big South Fork of the Cumberland River	1	1,2		No Business Creek	2		
Black Wolf Creek	2	3		North Prong Clear Fork		2	
Bone Camp Creek	2			North White Oak Creek	1	2	
Bridges Creek	2			Paint Rock Creek	2		
Brimstone Creek	1	3		Pine Creek	4		
Buffalo Creek	1			Puncheon Camp Creek	2		
Clear Fork River	1,2	1,2	2	Roaring Paunch Creek	2		
Crooked Creek	2			Rock Creek	1		
East Branch Bear Creek	3			Rockhouse Fork Creek	2		
Grassey Creek	2			Shoal Creek	2		
Langham Btranch Creek	1			Smith Creek	2		
Laurel Creek	1			Smokey Creek	2		
Laurel Fork Station Camp Creek	1			South Prong Clear Fork	1		
Ligias Fork New River	2			Station Camp Creek	2		
Little South Fork Creek	1			Straight Fork Creek	2		
Marcum Creek	2			Thompson Creek	1		
Mill Creek (Trib of North White Oak Creek)	2			West Prong Hill Creek	2		
Mill Creek (Trib of Brimstone Creek)	3			White Oak Creek	1	2,3	
Montgomery Creek	2			Williams Creek			2

Table 2-6. Tennessee Rivers Assessment Project Stream Scoring in the South Fork Cumberland River Watershed.

Categories: NSQ, Natural and Scenic Qualities
RB, Recreational Boating
RF, Recreational Fishing

Scores: 1. Statewide or greater Significance; Excellent Fishery
2. Regional Significance; Good Fishery
3. Local Significance; Fair Fishery
4. Not a significant Resource; Not Assessed

CHAPTER 3

WATER QUALITY ASSESSMENT OF THE SOUTH FORK CUMBERLAND RIVER WATERSHED.

3.1. BACKGROUND. Section 305(b) of The Clean Water Act requires states to report the status of water quality every two years. Historically, Tennessee's methodologies, protocols, frequencies and locations of monitoring varied depending upon whether sites were ambient, ecoregion, or intensive survey. Alternatively, in areas where no direct sampling data existed, water quality may have been assessed by evaluation or by the knowledge and experience of the area by professional staff.

In 1996, Tennessee began the watershed approach to water quality protection. In the Watershed Approach, resources—both human and fiscal—are better used by assessing water quality more intensively on a watershed-by-watershed basis. In this approach, water quality is assessed in year three of the watershed cycle, following one to two years of data collection. More information about the Watershed Approach may be found in Chapter 1 and at http://www.state.tn.us/environment/wpc/watershed/

The assessment information is used in the 305(b) Report (The Status of Water Quality in Tennessee) and the 303(d) list as required by the Clean Water Act.

The 305(b) Report documents the condition of the State's waters. Its function is to provide information used for water quality based decisions, evaluate progress, and measure success.

Tennessee uses the 305(b) Report to meet four goals (from 2006 305(b) Report):

1. Describe the water quality assessment process

2. Categorize waters in the State by placing them in the assessment categories suggested by federal guidance

3. Identify waterbodies that pose imminent human health risks due to elevated bacteria levels or contamination of fish

4. Provide detailed information on each watershed

EPA aggregates the state use support information into a national assessment of the nation's water quality. This aggregated use support information can be viewed at EPA's "Surf Your Watershed" site at http://cfpub.epa.gov/surf/locate/index.cfm.

The 303(d) list is a compilation of the waters of Tennessee that fail to support some or all of their classified uses. The 303(d) list does not include streams determined to be fully supporting designated uses nor streams the Division of Water Pollution Control cannot assess due to lack of water quality information. Also absent are streams where a control strategy is already in the process of being implemented.

Once a stream is placed on the 303(d) list, it is considered a priority for water quality improvement efforts. These efforts not only include traditional regulatory approaches such as permit issuance, but also include efforts to control pollution sources that have historically been exempted from regulations, such as certain agricultural and forestry activities. If a stream is on the 303(d) list, the Division of Water Pollution Control cannot use its regulatory authority to allow additional sources of the same pollutant(s) for which it is listed.

States are required to develop Total Maximum Daily Loads (TMDLs) for 303(d)-listed waterbodies. The TMDL process establishes the maximum amount of a pollutant that a waterbody can assimilate without exceeding water quality standards and allocates this load among all contributing pollutant sources. The purpose of the TMDL is to establish water quality objectives required to reduce pollution from both point and nonpoint sources and to restore and maintain the quality of water resources.

The current 303(d) List is available on the TDEC homepage at:
http://tennessee.gov/environment/wpc/publications/303d2006.pdf

and information about Tennessee's TMDL program may be found at:
http://www.state.tn.us/environment/wpc/tmdl/.

This chapter provides a summary of water quality in the Tennessee portion of the South Fork Cumberland River Watershed, summarizes data collection and assessment results, and describes impaired waters.

3.2. DATA COLLECTION. The figures and table below represent data collected in the last 5-year cycle (July 1, 2000 through June 30, 2005). Water quality data are from one of four site types: (1) Ambient sites, (2) Ecoregion sites, (3) Watershed Screening sites, or (4) Tier Evaluation sites.

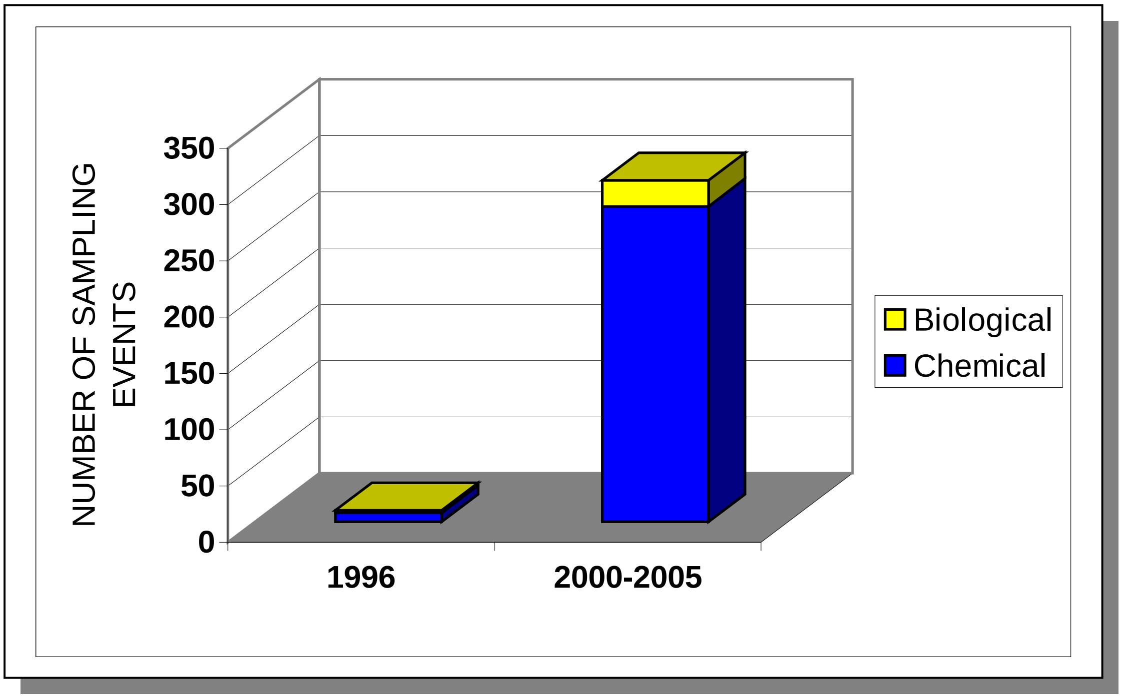


Figure 3-1. Number of Sampling Events Using the Traditional Approach (1996) and Watershed Approach (July 1, 2000 through June 30, 2005) in the Tennessee Portion of the South Fork Cumberland River Watershed.

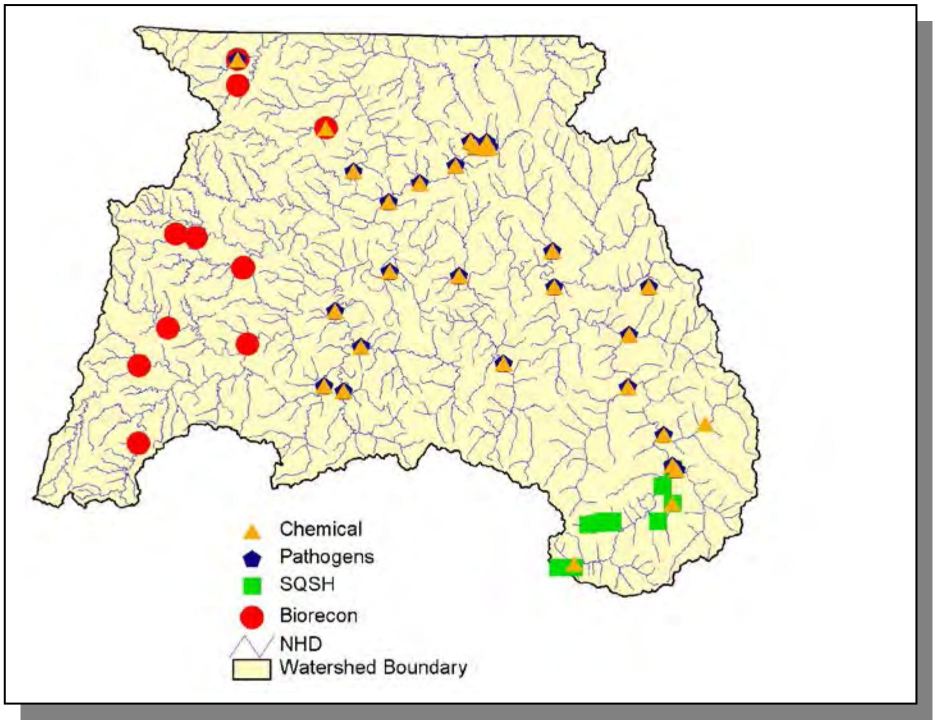


Figure 3-2. Location of Monitoring Sites in the Tennessee Portion of the South Fork Cumberland River Watershed (July 1, 2000 through June 30, 2005). *Pathogens include E. coli and fecal coliform; NHD, National Hydrography Dataset of Streams; SQSH, Semi-Quantitative Single Habitat Assessment.*

	1996	**2000-2005**
Biological	2	23
Chemical	8	280
Total	**10**	**303**

Table 3-1. Number of Sampling Events in the Tennessee Portion of the South Fork Cumberland River Watershed in the last 5-Year Cycle (July 1, 2000 through June 30, 2005).

3.2.A. Ambient Monitoring Sites. These fixed-station chemical monitoring sites are sampled quarterly or monthly by the Environmental Field Office-Knoxville and Environmental Field Office-Cookeville staff (this is in addition to samples collected by water and wastewater treatment plant operators). Samples are analyzed by the Tennessee Department of Health, Division of Environmental Laboratory Services. Ambient monitoring data are used to assess water quality in major bodies of water where there are NPDES facilities and to identify trends in water quality. Water quality parameters traditionally measured at ambient sites in the Tennessee portion of the South Fork Cumberland River Watershed are provided in Appendix IV.

Data from ambient monitoring stations are entered into the STORET (Storage and Retrieval) system administered by EPA.

3.2.B. Ecoregion Sites. Ecoregions are relatively homogeneous areas of similar geography, topography, climate and soils that support similar plants and animals. The delineation phase of the Tennessee Ecoregion Project was completed in 1997 when the ecoregions and subecoregions were mapped and summarized (EPA/600/R-97/022). There are eight Level III Ecoregions and twenty-five Level IV subecoregions in Tennessee (see Chapter 2 for more details). The Tennessee portion of the South Fork Cumberland River Watershed lies within 2 Level III ecoregions (Southwestern Appalachians and Central Appalachians) and contains 3 subecoregions (Level IV):

- Cumberland Plateau (68a)
- Plateau Escarpment (68c)
- Cumberland Mountains (69d)

Ecoregion reference sites are chemically monitored using methodology outlined in the Division's Chemical Standard Operating Procedure (Standard Operating Procedure for Modified Clean Technique Sampling Protocol). Macroinvertebrate samples are collected in spring and fall. These biological sample collections follow methodology outlined in the Tennessee Biological Standard Operating Procedures Manual. Volume 1: Macroinvertebrates and EPA's Revision to Rapid Bioassessment Protocols for use in Streams and Rivers.

Ecoregion stations are scheduled to be monitored during the watershed sampling time period.

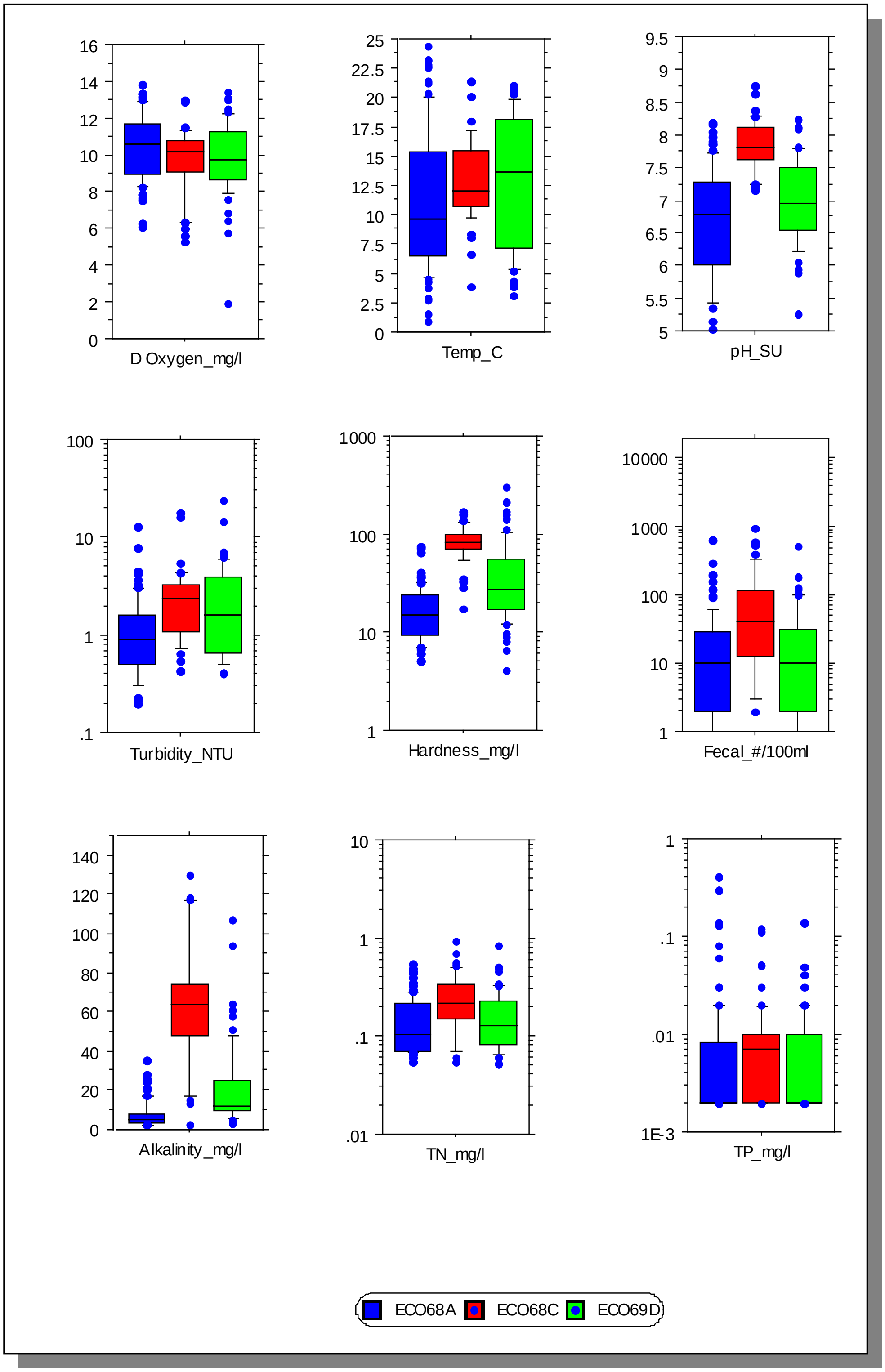


Figure 3-3. Select Chemical Data Collected in the Tennessee Portion of South Fork Cumberland Watershed Ecoregion Sites. *Boxes and bars illustrate 10th, 25th, median, 75th, and*

90^{th} percentiles. Extreme values are also shown as dots. Fecal, fecal coliform bacteria; TN, Total

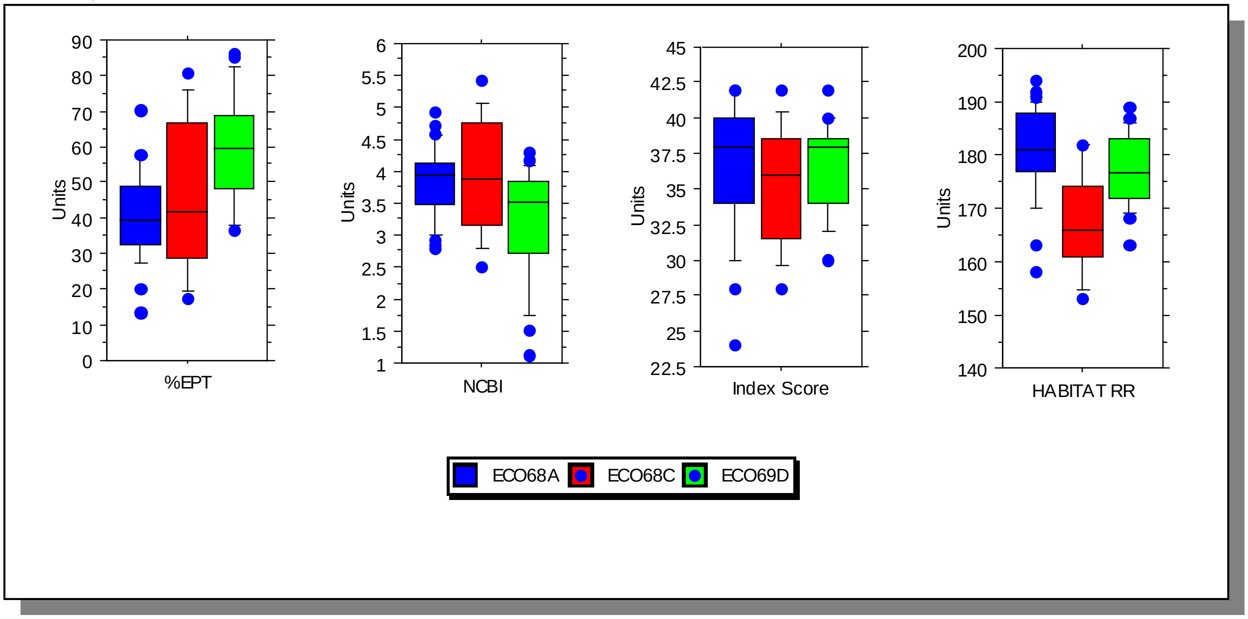


Figure 3-4. Benthic Macroinvertebrate and Habitat Scores for the Tennessee Portion of South Fork Cumberland River Watershed Ecoregion Sites. *Boxes and bars illustrate 10^{th}, 25^{th}, median, 75^{th}, and 90^{th} percentiles. Extreme values are also shown as dots. NCBI, North Carolina Biotic Index. Index Score and Habitat Riffle/Run scoring system are described in TDEC's Quality System Standard Operating Procedure for Macroinvertebrate Stream Surveys (2006).*

3.2.C. Watershed Screening Sites. Activities that take place at watershed sites are benthic macroinvertebrate stream surveys, physical habitat determinations and/or chemical monitoring. Following review of existing data, watershed sites are selected in Year 1 of the watershed approach when preliminary monitoring strategies are developed. Additional sites may be added in Year 2 when additional monitoring strategies are implemented.

A Biological Reconnaissance (BioRecon) is used as a screening tool to describe the condition of water quality, in general, by determining the absence or presence of clean water indicator organisms, such as EPT (Ephemeroptera [mayfly], Plecoptera [stonefly], Trichoptera [caddisfly]). Factors and resources used for selecting BioRecon sites are:

- The current 303(d) list,
- HUC-10 maps (every HUC-10 is scheduled for a BioRecon)
- Land Use/Land Cover maps
- Topographic maps
- Locations of NPDES facilities
- Sites of recent ARAP activities.

An intensive multiple or single habitat assessment involves the regular monitoring of a station over a fixed period of time. Intensive surveys (Rapid Bioassessment Protocols) are performed when BioRecon results warrant it.

3.2.D. Special Surveys. These investigations are performed when needed and include:

- ARAP in-stream investigation
- Time-of-travel dye study
- Sediment oxygen demand study
- Lake eutrophication study

3.3. STATUS OF WATER QUALITY. Use support determinations, which can be classified as monitored or evaluated, are based on:

- Data less than 5 years old (monitored)
- Data more than 5 years old (evaluated)
- Knowledge and experience of the area by technical staff (evaluated)
- Complaint investigation (monitored, if samples are collected)
- Other readily available Agencies' data (monitored)
- Readily available Volunteer Monitoring data (monitored, if certain quality assurance standards are met)

All readily available data are considered, including data from TDEC Environmental Field Offices, Tennessee Department of Health (Aquatic Biology Section of Laboratory Services), Tennessee Wildlife Resources Agency, National Park Service, Tennessee Valley Authority, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Geological Survey, U.S. Forest Service, universities and colleges, the regulated community, and the private sector.

The assessment is based on the degree of support of designated uses as measured by compliance with Tennessee's water quality standards.

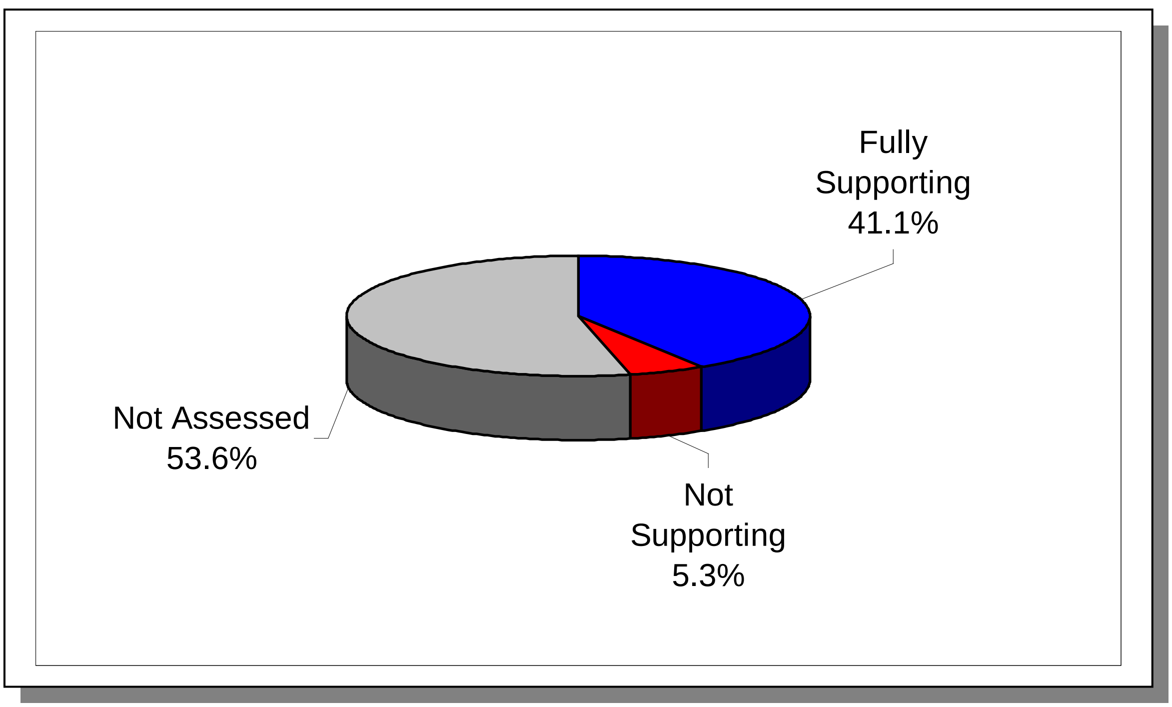


Figure 3-5. Water Quality Assessment of Streams in the Tennessee Portion of the South Fork Cumberland River Watershed. *Assessment data are based on the 2004 Water Quality Assessment of 1,378 stream miles in the watershed. More information is provided in Appendix III.*

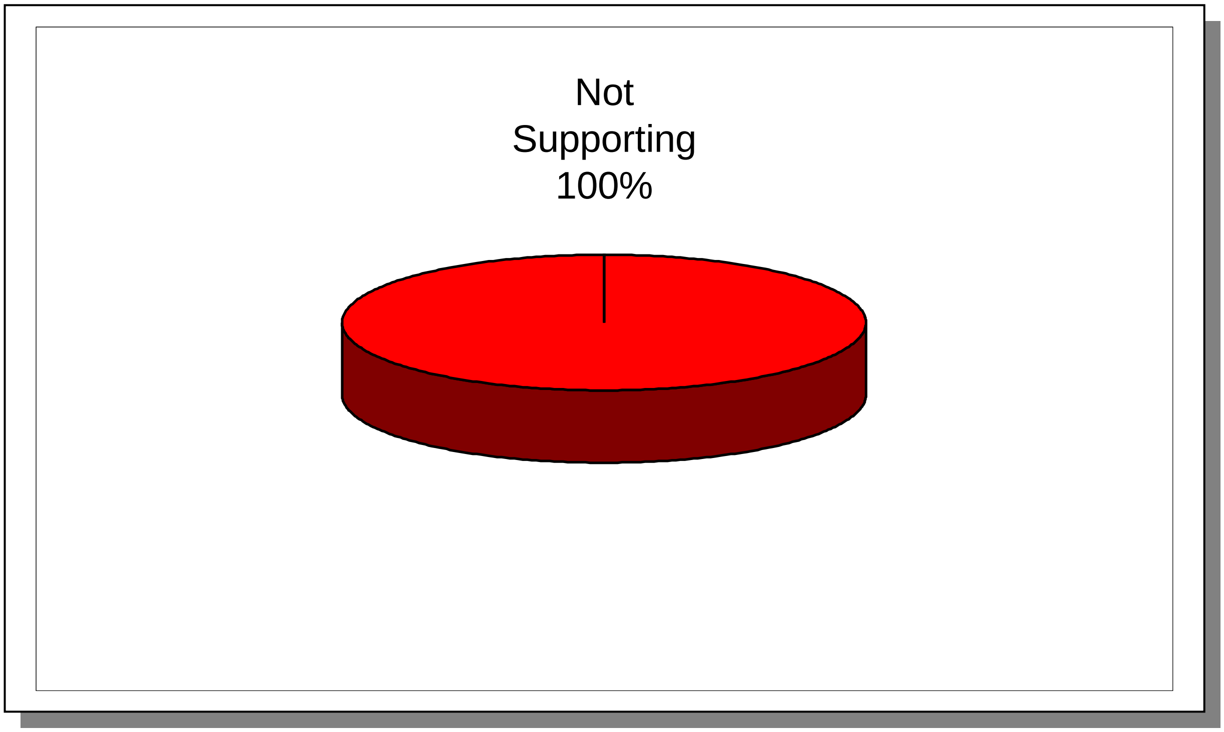


Figure 3-6. Water Quality Assessment of Lakes in the Tennessee Portion of the South Fork Cumberland River Watershed. *Assessment data are based on the 2004 Water Quality Assessment of 5 lake acres in the watershed. More information is provided in Appendix III.*

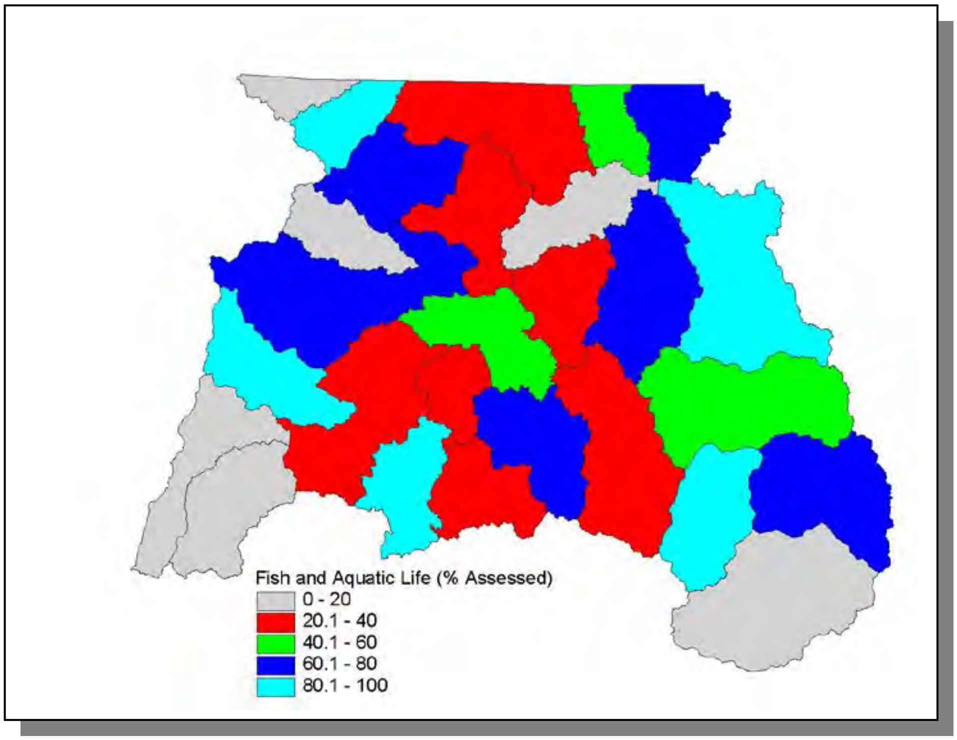


Figure 3-7. Percentage of Stream Miles Assessed for Support of Fish and Aquatic Life Designated Use in HUC-12 Subwatersheds.

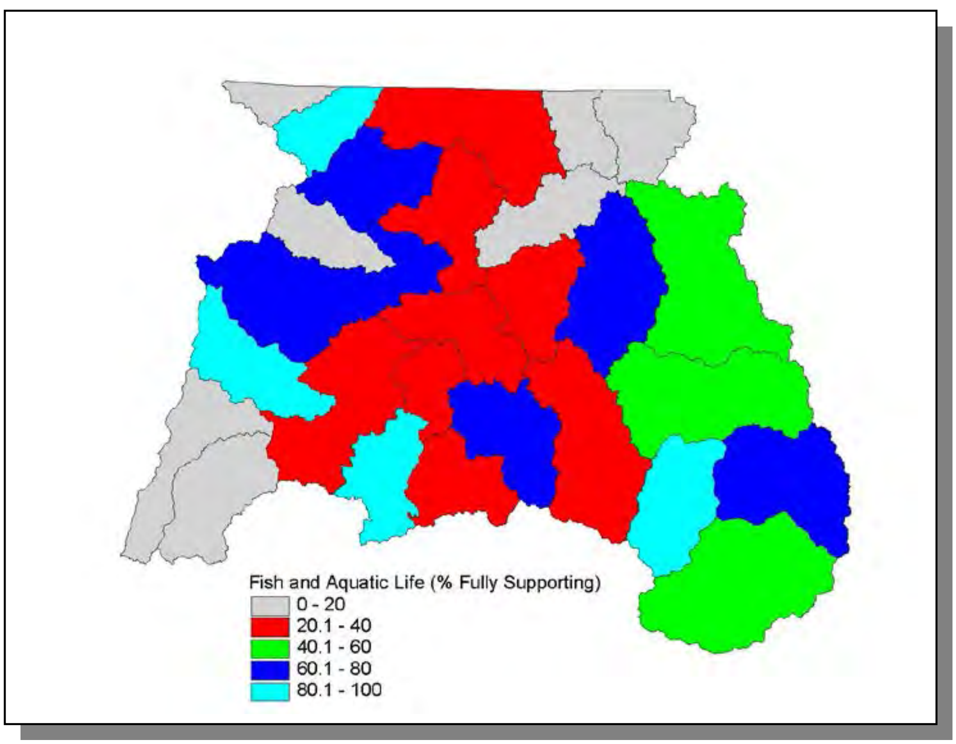


Figure 3-8. Percentage of Stream Miles Fully Supporting for Fish and Aquatic Life Designated Use in HUC-12 Subwatersheds.

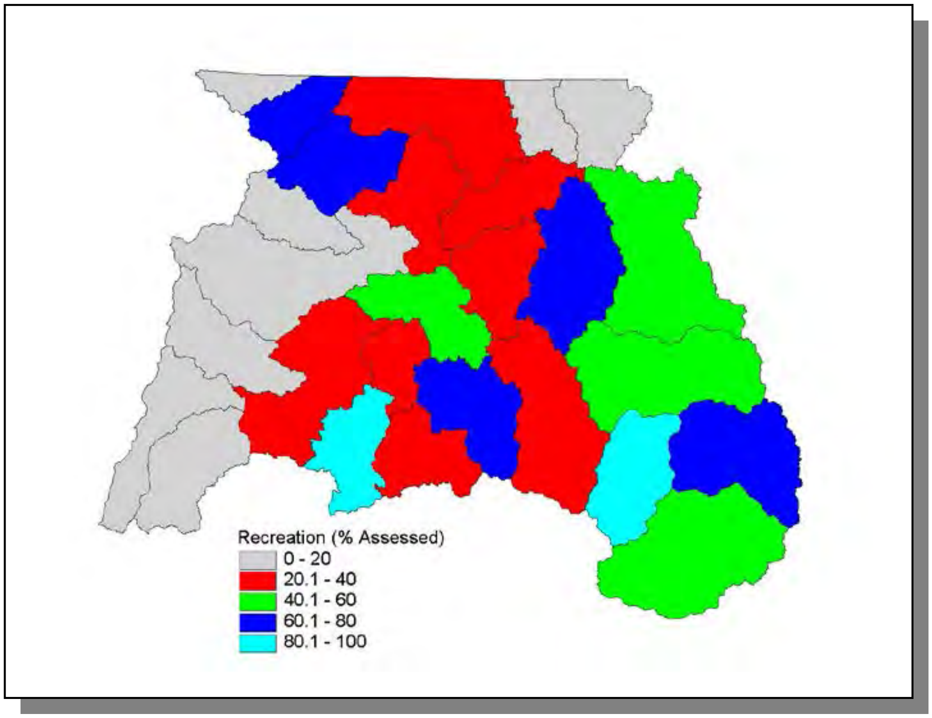


Figure 3-9. Percentage of Stream Miles Assessed for Support of Recreation Designated Use in HUC-12 Subwatersheds.

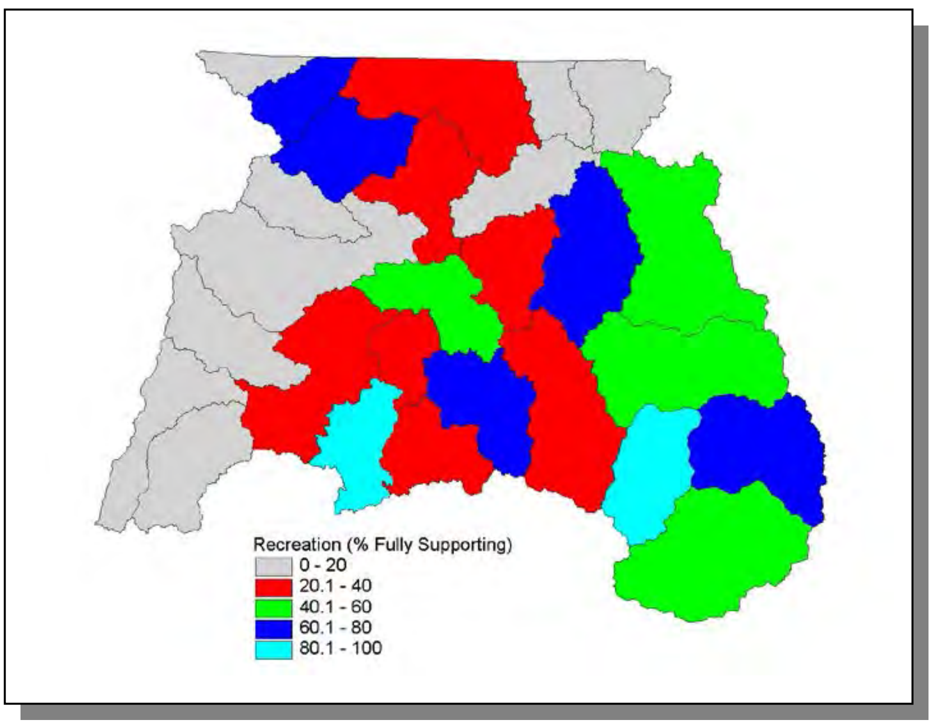


Figure 3-10. Percentage of Stream Miles Fully Supporting for Recreation Designated Use in HUC-12 Subwatersheds.

3.3.A. Assessment Summary.

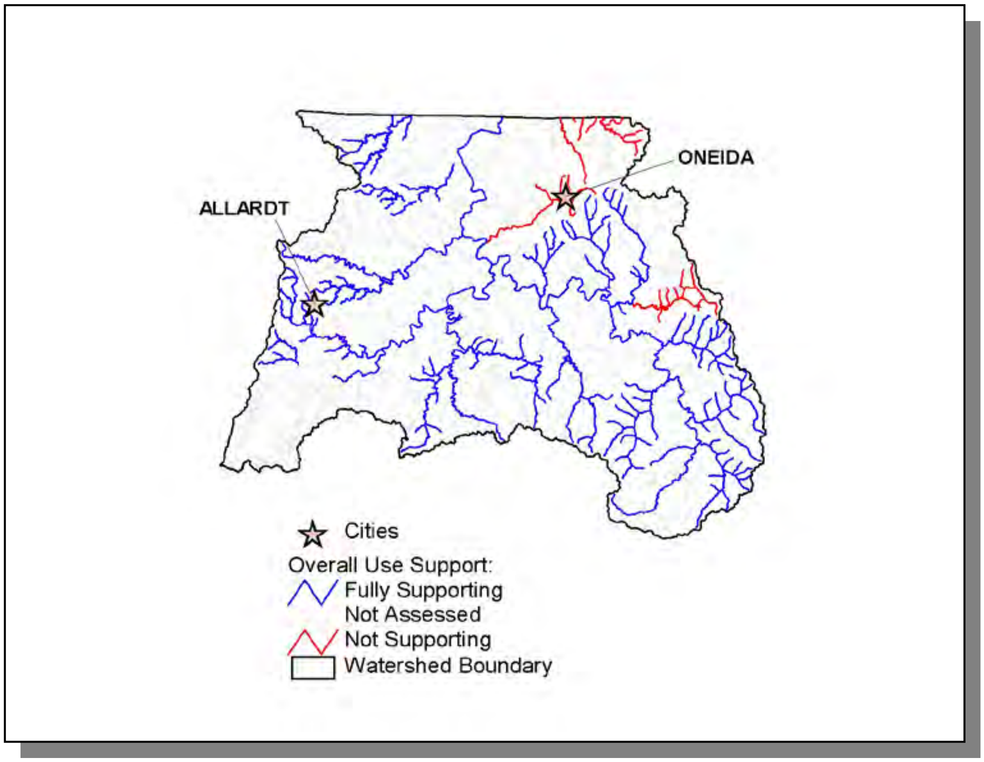


Figure 3-11. Overall Use Support Attainment in the Tennessee Portion of the South Fork Cumberland River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Allardt and Oneida are shown for reference. More information is provided in Appendix III.*

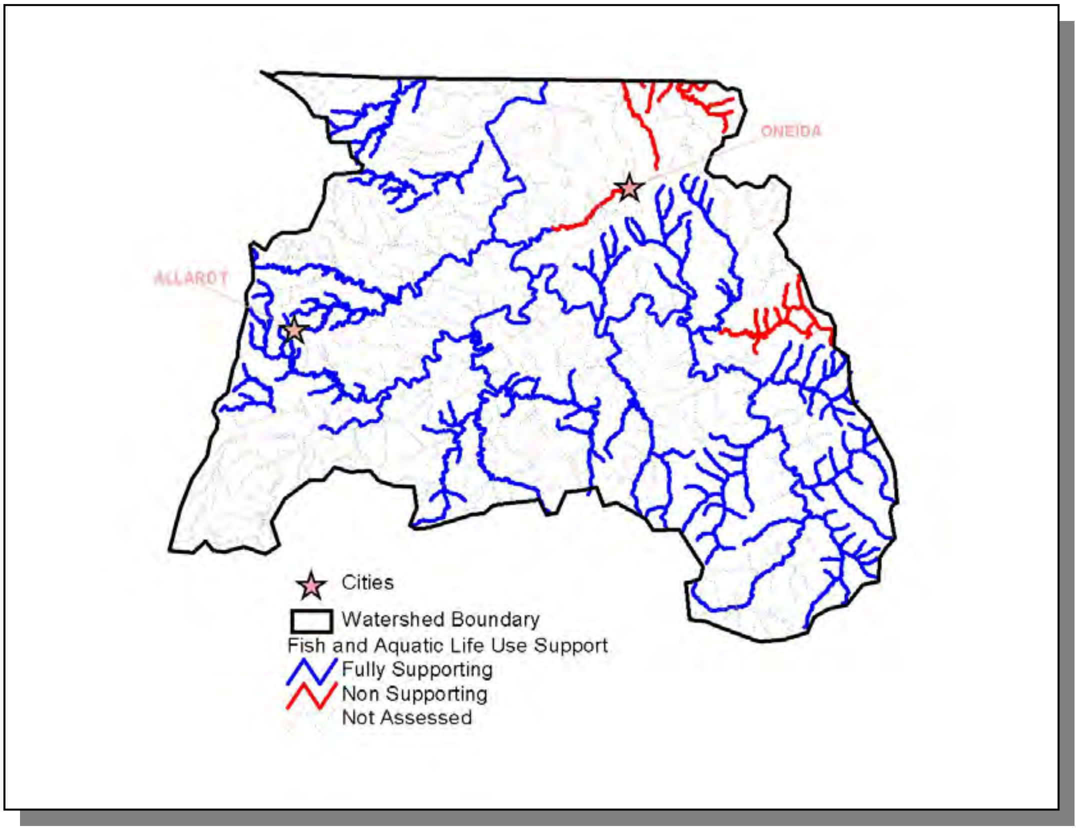


Figure 3-12. Fish and Aquatic Life Use Support Attainment in the Tennessee Portion of the South Fork Cumberland River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Allardt and Oneida are shown for reference. More information is provided in Appendix III.*

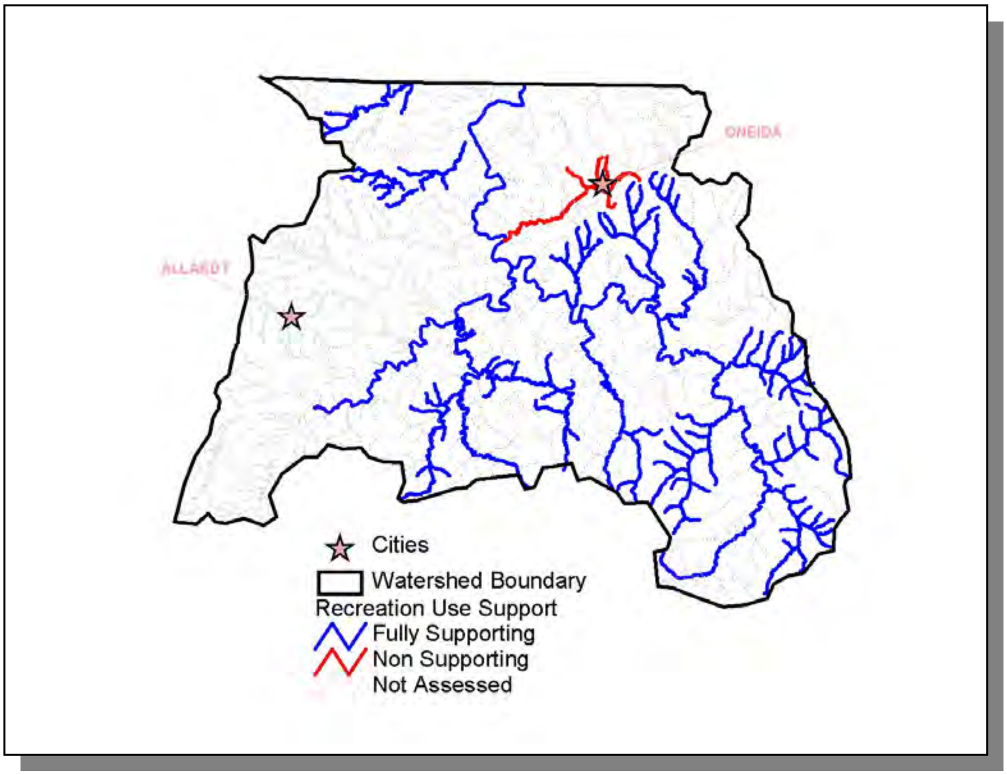


Figure 3-13. Recreation Use Support Attainment in the Tennessee Portion of the South Fork Cumberland River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Allardt and Oneida are shown for reference. More information is provided in Appendix III.*

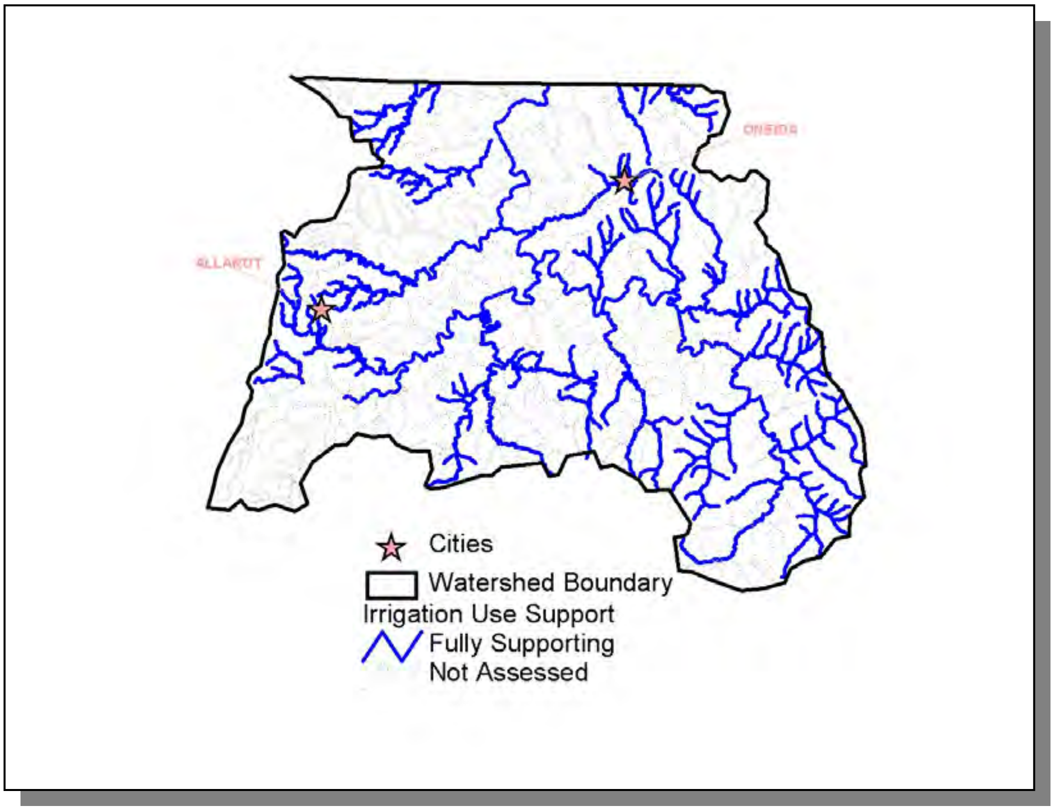


Figure 3-14. Irrigation Use Support Attainment in the Tennessee Portion of the South Fork Cumberland River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Allardt and Oneida are shown for reference. More information is provided in Appendix III.*

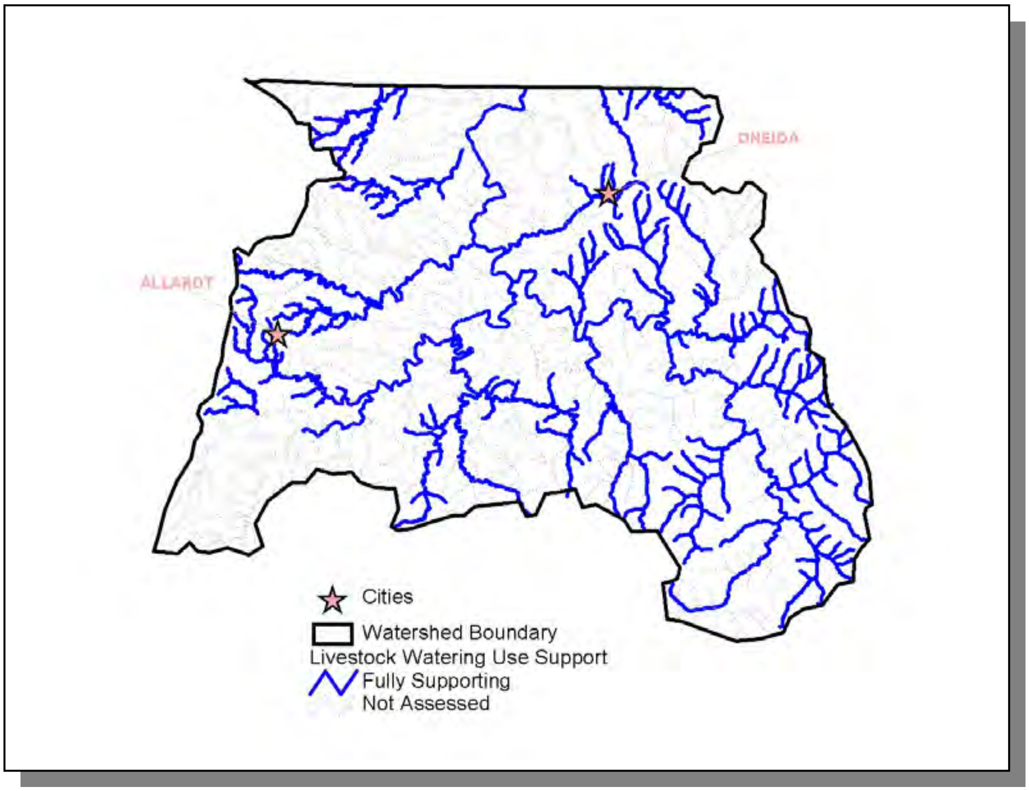


Figure 3-15. Livestock Watering and Wildlife Use Support Attainment in the Tennessee Portion of the South Fork Cumberland River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Allardt and Oneida are shown for reference. More information is provided in Appendix III.*

3.3.B. Use Impairment Summary.

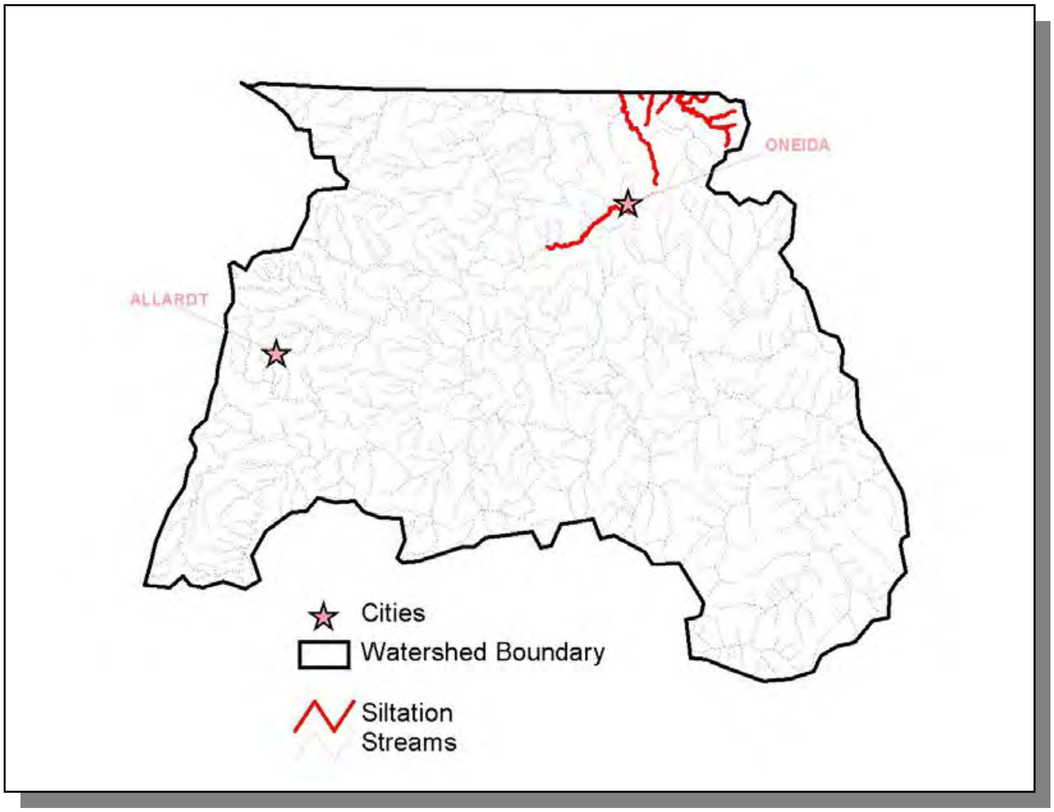


Figure 3-16. Impaired Streams Due to Siltation in the Tennessee Portion of the South Fork Cumberland River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Locations of Allardt and Oneida are shown for reference. More information is provided in Appendix III.*

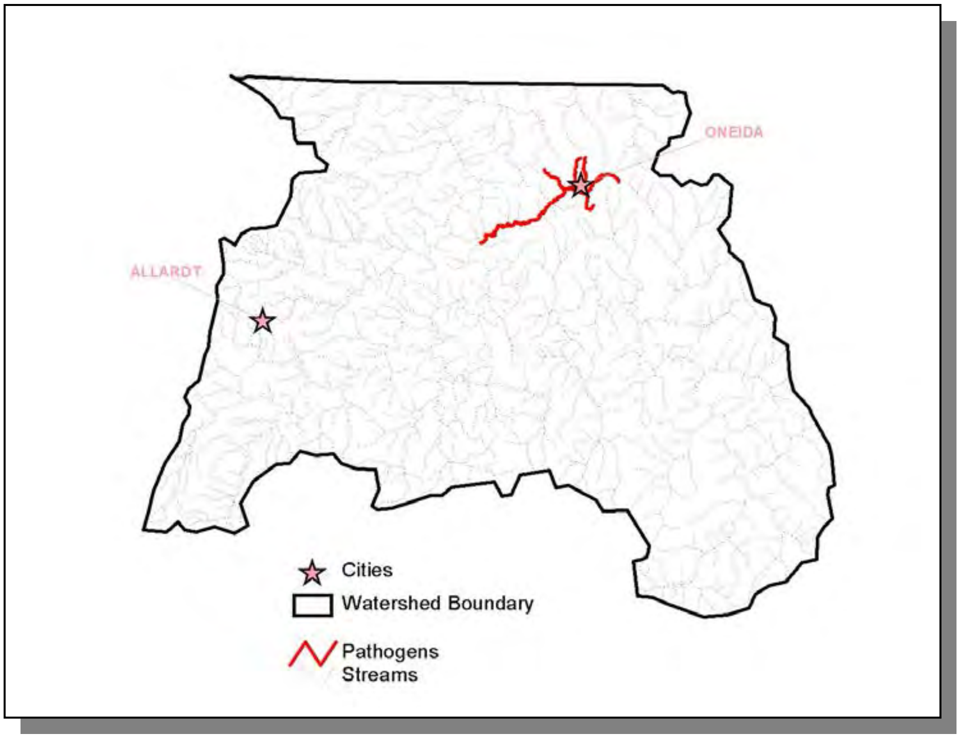


Figure 3-17. Impaired Streams Due to Pathogens in the Tennessee Portion of the South Fork Cumberland River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Pathogens represent E. Coli and total fecal coliform data. Locations of Allardt and Oneida are shown for reference. More information is provided in Appendix III.*

The listing of impaired waters that do not support designated uses (the 303(d) list) is traditionally submitted to EPA every two years. A copy of the most recent 303(d) list may be downloaded from:
http://tennessee.gov/environment/wpc/publications/303d2006.pdf

Since the year 2002, the 303(d) list has been compiled by using EPA's ADB (Assessment Database) software developed by RTI (Research Triangle Institute). The ADB allows for a more detailed segmentation of waterbodies. While this results in a more accurate description of the status of water quality, it makes it difficult when comparing water quality assessments with and without using this tool. A more meaningful comparison will be between assessments completed in Year 3 of each succeeding five-year cycle.

The ADB was used to create maps that illustrate water quality. These maps may be viewed on TDEC's homepage at http://gis2.memphis.edu/wpc.

CHAPTER 4

POINT AND NONPOINT SOURCE CHARACTERIZATION OF THE SOUTH FORK CUMBERLAND RIVER WATERSHED

4.1. BACKGROUND. This chapter is organized by HUC-12 subwatershed, and the description of each subwatershed is divided into four parts:

- i. General description of the subwatershed
- ii. Description of point source contributions
- ii.a. Description of facilities discharging to water bodies listed on the 2004 303(d) list
- iii. Description of nonpoint source contributions

The Tennessee portion of the South Fork Cumberland River Watershed (HUC 05130104) has been delineated into six HUC 10 (10-digit) subwatersheds, each of which is composed of one or more HUC-12 subwatersheds.

Information for this chapter was obtained from databases maintained by the Division of Water Pollution Control or provided in the WCS (Watershed Characterization System) data set. The WCS used was version 2.0 (developed by Tetra Tech, Inc for EPA Region 4) released in 2003.

WCS integrates with ArcView® v3.x and Spatial Analyst® v1.1 to analyze user-delineated (sub)watersheds based on hydrologically connected water bodies. Reports are generated by integrating WCS with Microsoft® Word. Land Use/Land Cover information from 1992 MRLC (Multi-Resolution Land Cover) data are calculated based on the proportion of county-based land use/land cover in user-delineated (sub)watersheds. Nonpoint source data in WCS are based on agricultural census data collected 1992–1998; nonpoint source data were reviewed by Tennessee NRCS staff.

Figure 4-1. The Tennessee Portion of the South Fork of the Cumberland River Watershed is Composed of Six USGS-Delineated Subwatersheds (10-Digit Subwatersheds). *Locations of Allardt, Devonia, Huntsville, Oneida, and Sunbright are shown for reference.*

4.2. CHARACTERIZATION OF HUC-10 SUBWATERSHEDS. The Watershed Characterization System (WCS) software and data sets provided by EPA Region IV were used to characterize each subwatershed in the Tennessee portion of the South Fork Cumberland River Watershed.

HUC-10	HUC-12
0513010401	051301040101 (New River)
	051301040102 (New River)
	051301040103 (Smokey Creek)
	051301040104 (New River)
	051301040105 (Buffalo Creek)
	051301040106 (New River)
	051301040107 (Brimstone Creek)
	051301040108 (New River)
0513010402	051301040201 (North Prong Clear Fork)
	051301040202 (South Prong Clear Fork)
	051301040203 (Upper Clear Fork)
	051301040204 (Crooked Creek)
	051301040205 (Lower Clear Fork)
0513010403	051301040301 (Upper Whiteoak Creek)
	051301040302 (Camp Creek)
	051301040303 (Black Wolf Creek)
	051301040304 (Lower Whiteoak Creek)
0513010404	051301040401 (Big South Fork)
	051301040402 (Pine Creek)
	051301040403 (Station Camp Creek)
	051301040404 (Big South Fork)
	051301040405 (Bear Creek)
	051301040407 (Roaring Paunch Creek)
	051301040408 (Rock Creek)
0513010405	051301040501 (North Whiteoak Creek)
	051301040502 (Laurel Fork)
0513010407	051301040701 (Little South Fork)

Table 4-1. HUC-12 Drainage Areas are Nested Within HUC-10 Drainages. *NRCS worked with USGS to delineate the HUC-10 and HUC-12 drainage boundaries.*

4.2.A. 0513010401.

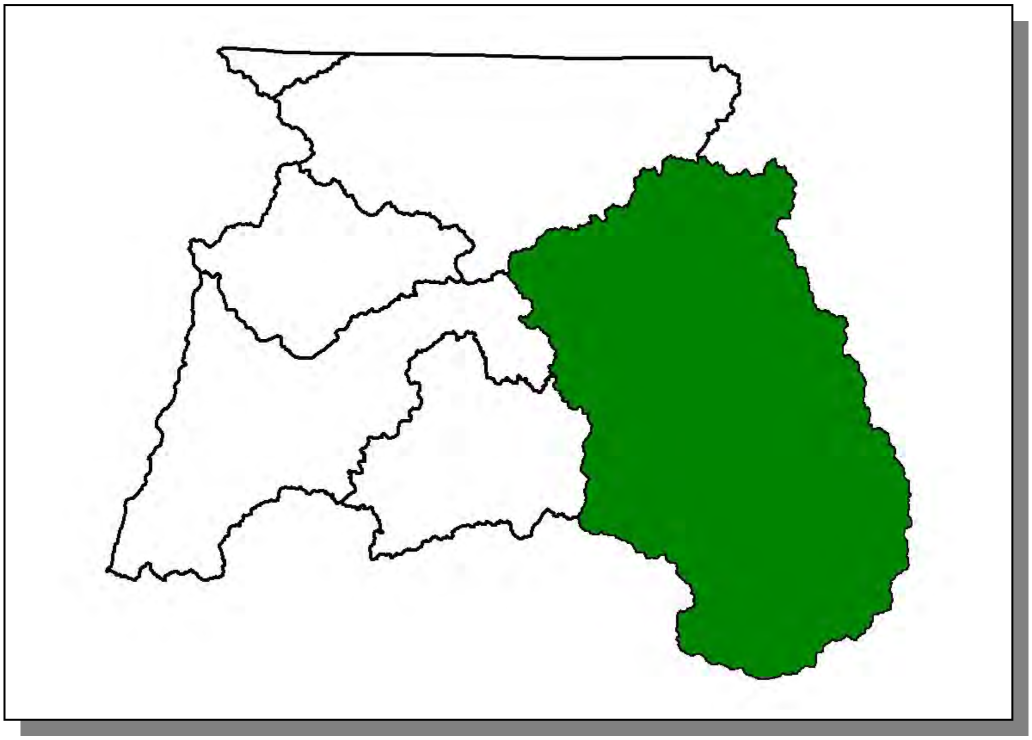


Figure 4-2. Location of Subwatershed 0513010401. *All South Fork Cumberland River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.2.A.i. 051301040101 (New River).

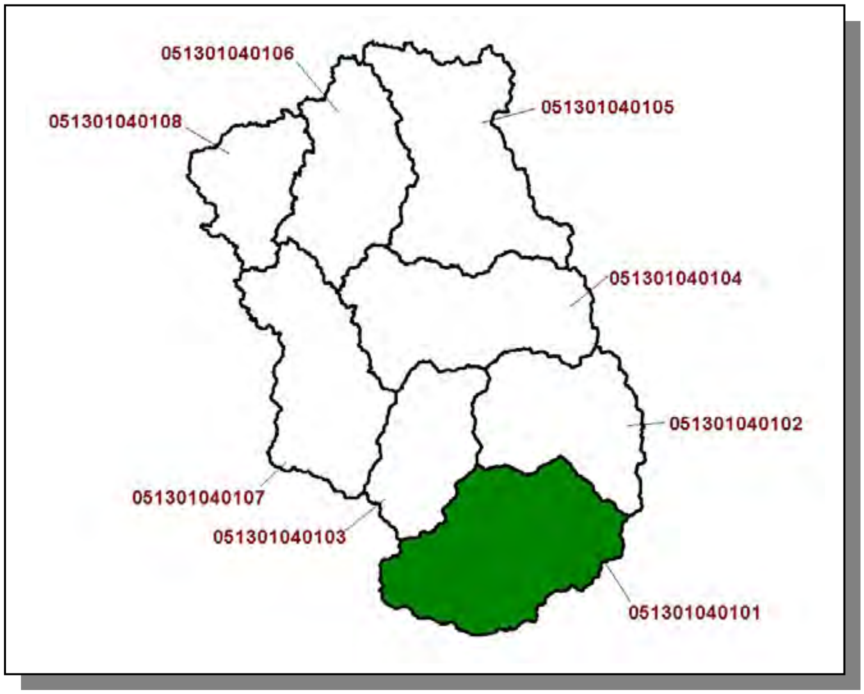


Figure 4-3. Location of Subwatershed 051301040101. *All HUC-12 subwatershed boundaries are shown for reference.*

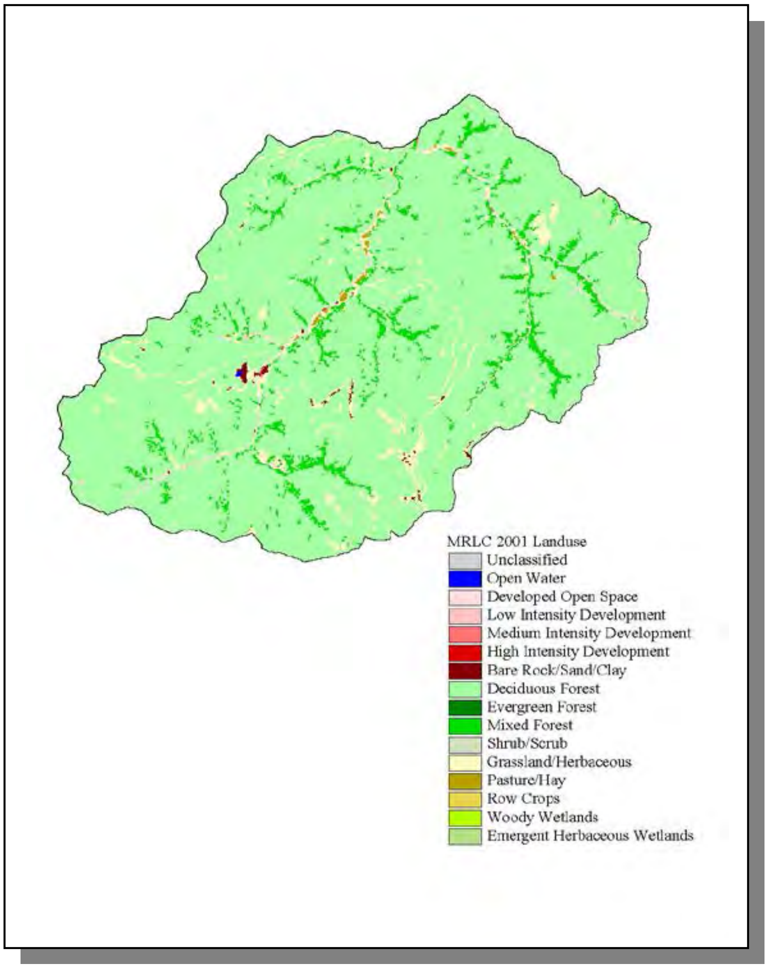


Figure 4-4. Illustration of Land Use Distribution in Subwatershed 051301040101.

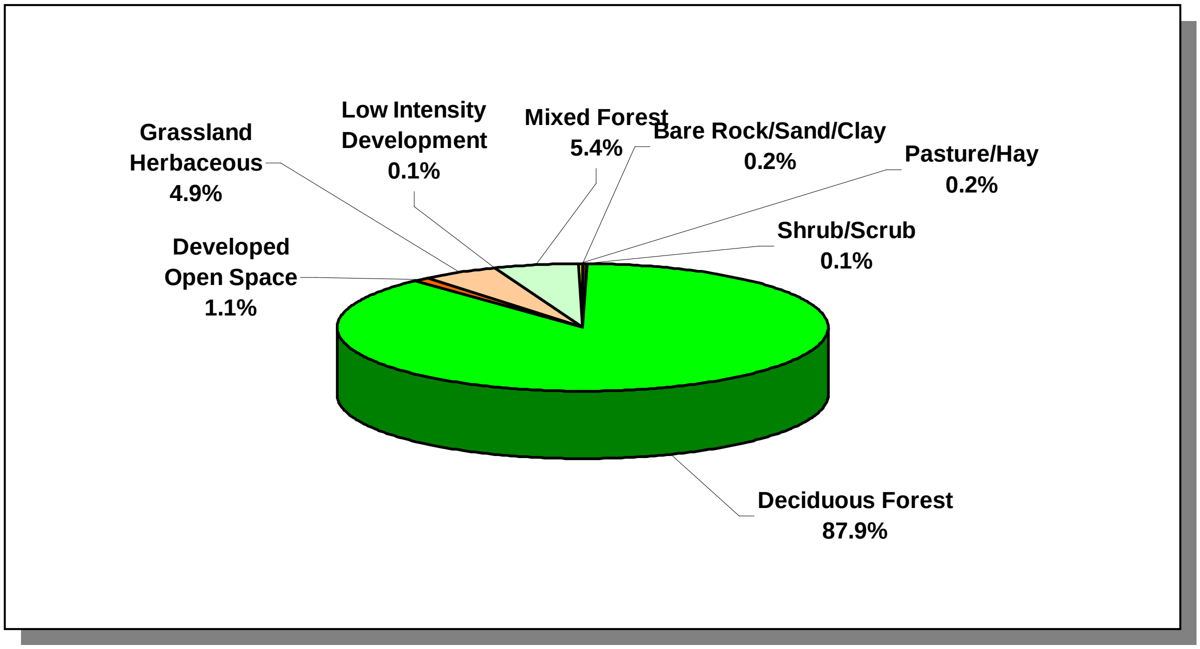


Figure 4-5. Land Use Distribution in Subwatershed 051301040101. *More information is provided in Appendix IV.*

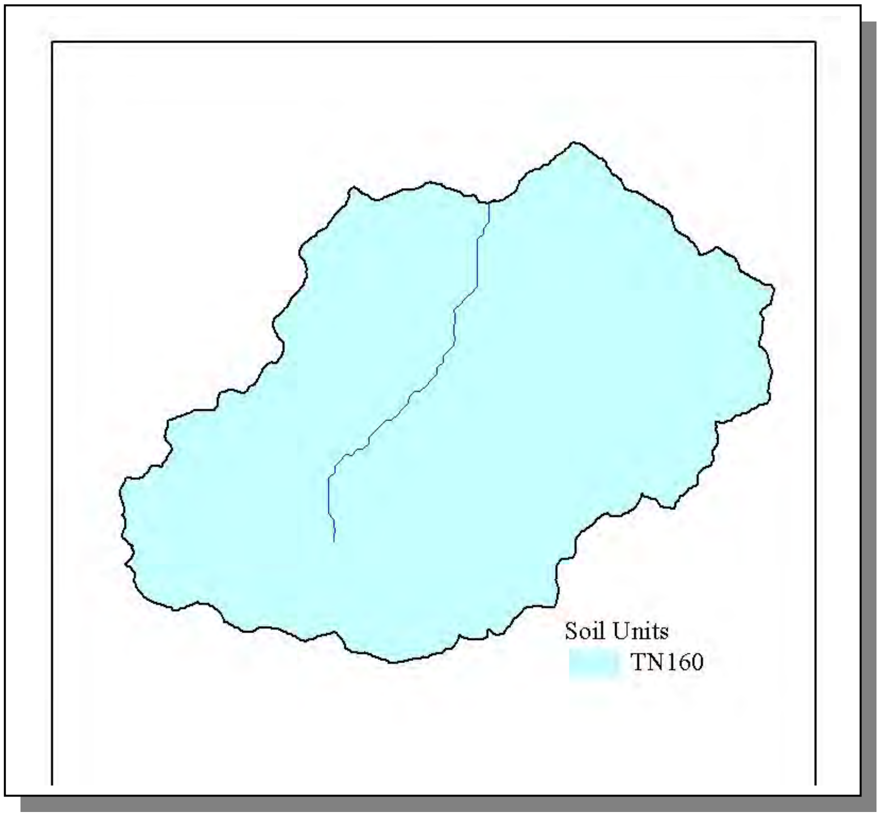


Figure 4-6. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040101.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN160	0.00	B	2.69	5.36	Loam	0.25

Table 4-2. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040101. The definition of "Hydrologic Group" is provided in Appendix IV.

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Anderson	68,250	71,498	71,330	18.21	12,427	13,019	12,988	4.5
Campbell	35,079	37,878	39,854	0.01	4	4	5	25.0
Morgan	17,300	18,521	19,757	0.1	121	129	138	14.0
Scott	18,358	19,816	21,127	0.06	12	13	14	16.7
Total	**138,987**	**147,713**	**152,206**		**12,564**	**13,165**	**13,145**	**4.6**

Table 4-3. Population Estimates in Subwatershed 051301040101.

Figure 4-7. Location of Historical Streamflow Data Collection Sites in Subwatershed 051301040101. *More information is provided in Appendix IV.*

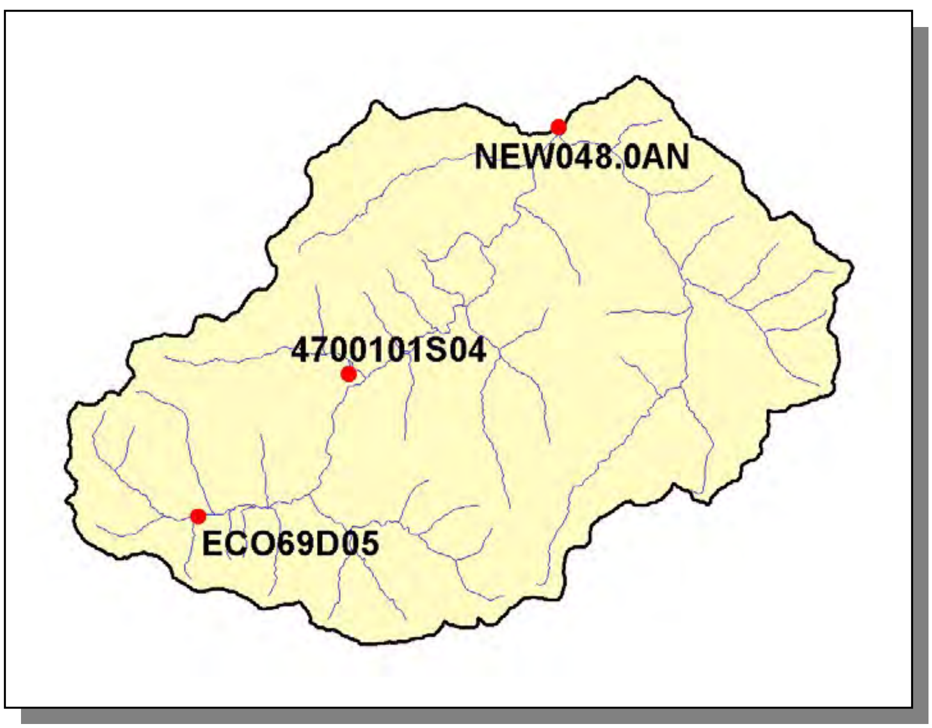


Figure 4-8. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301040101. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.A.i.a. Point Source Contributions.

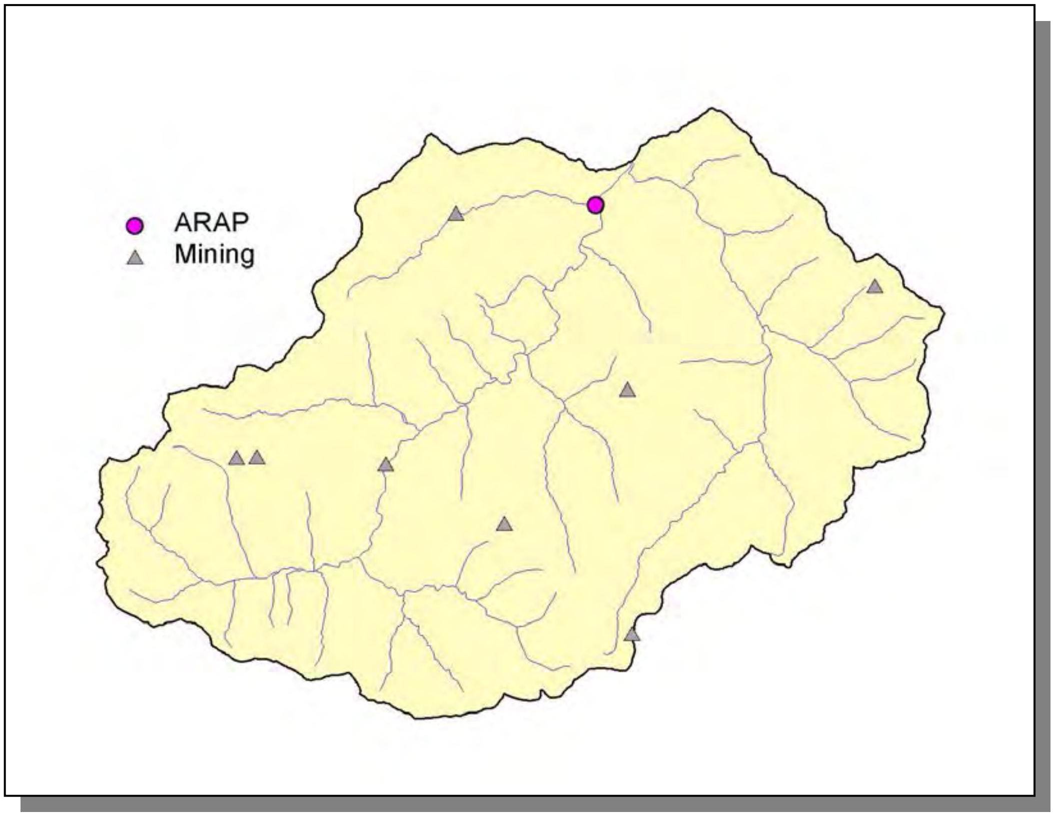


Figure 4-9. Location of Permits Issued in Subwatershed 051301040101. *More information, including the names of facilities, is provided in Appendix IV.*

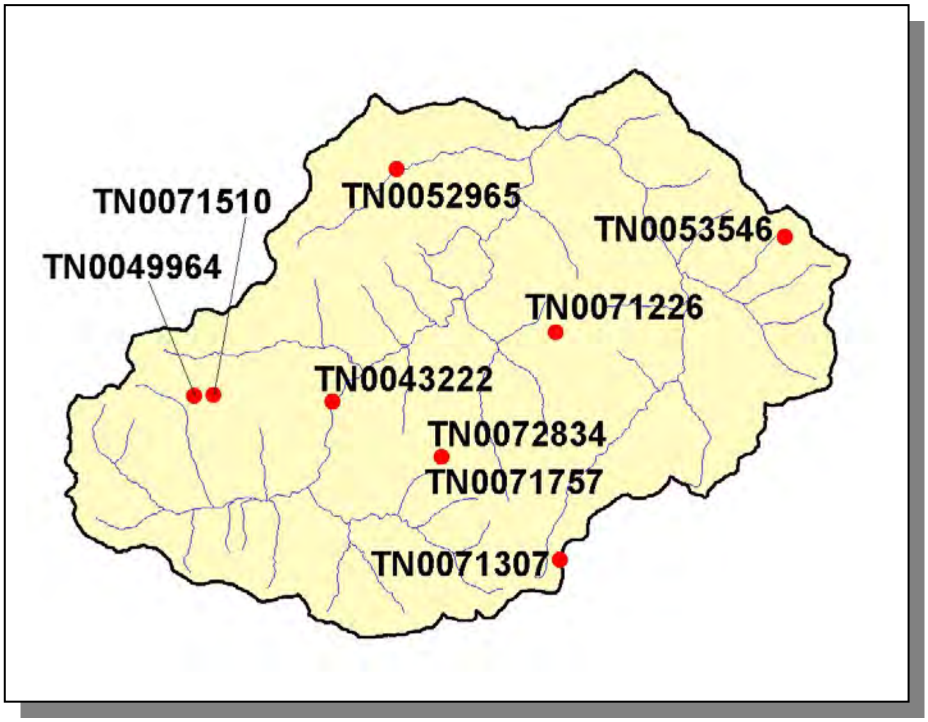


Figure 4-10. Location of Active Mining Sites in Subwatershed 051301040101. *More information, including the names of mining operations, is provided in Appendix IV.*

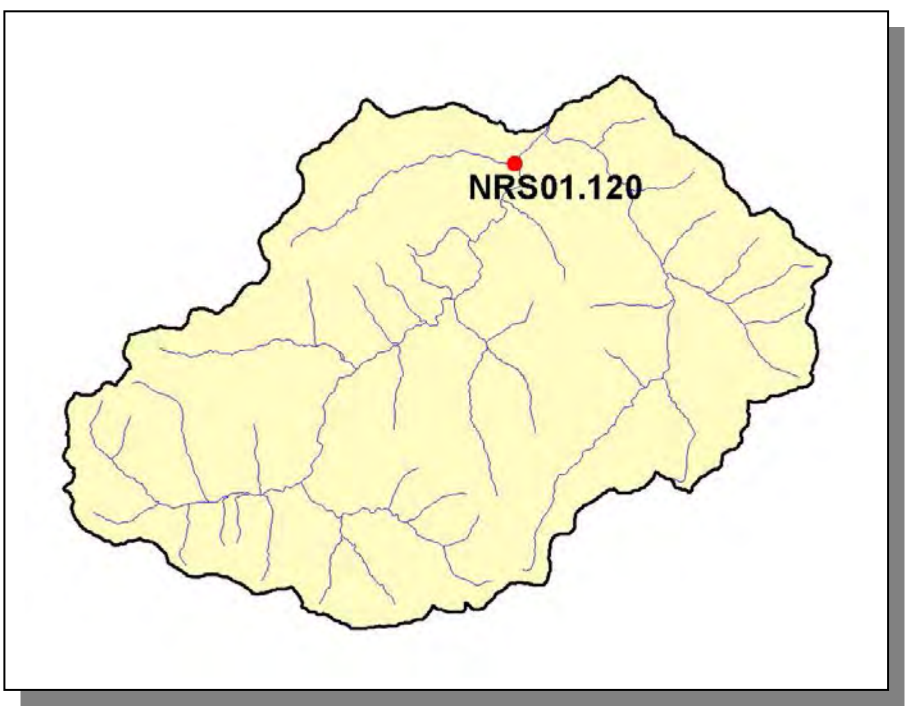


Figure 4-11. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 051301040101. *More information is provided in Appendix IV.*

4.2.A.i.b. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
95	202	7	<5	455	0	<5

Table 4-4. Summary of Livestock Count Estimates in Subwatershed 051301040101. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Chickens (Layers)	Hogs	Sheep
Anderson	4,449	9,458	335		769		135
Campbell	4,083	7,684	66		8	14	
Morgan	4,697	8,853	251	1,501,559	194	83	35
Scott	2,177	4,447	216	1,989,506	196	17	74

Table 4-5. Summary of Livestock Count Estimates in Anderson, Campbell, Morgan, and Scott Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Anderson	124.0	124.0	2.6	6.0
Campbell	250.3	250.2	2.6	10.6
Morgan	287.8	276.2	3.5	10.9
Scott	300.3	300.3	5.5	21.4

Table 4-6. Forest Acreage and Annual Removal Rates (1987-1994) in Anderson, Campbell, Morgan, and Scott Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	1.37
Grass (Hayland)	0.75
Legumes (Hayland)	1.07
Legumes, Grass (Hayland)	3.18
Grass, Forbs, Legumes (Mixed Pasture)	1.60
Corn (Row Crops)	7.18
Tobacco (Row Crops)	1.63
Other Vegetable Truck Crops	12.05
Other Land in Farms	0.23
Farmsteads and Ranch Headquarters	1.00

Table 4-7. Annual Estimated Total Soil Loss in Subwatershed 051301040101.

4.2.A.ii. 051301040102 (New River).

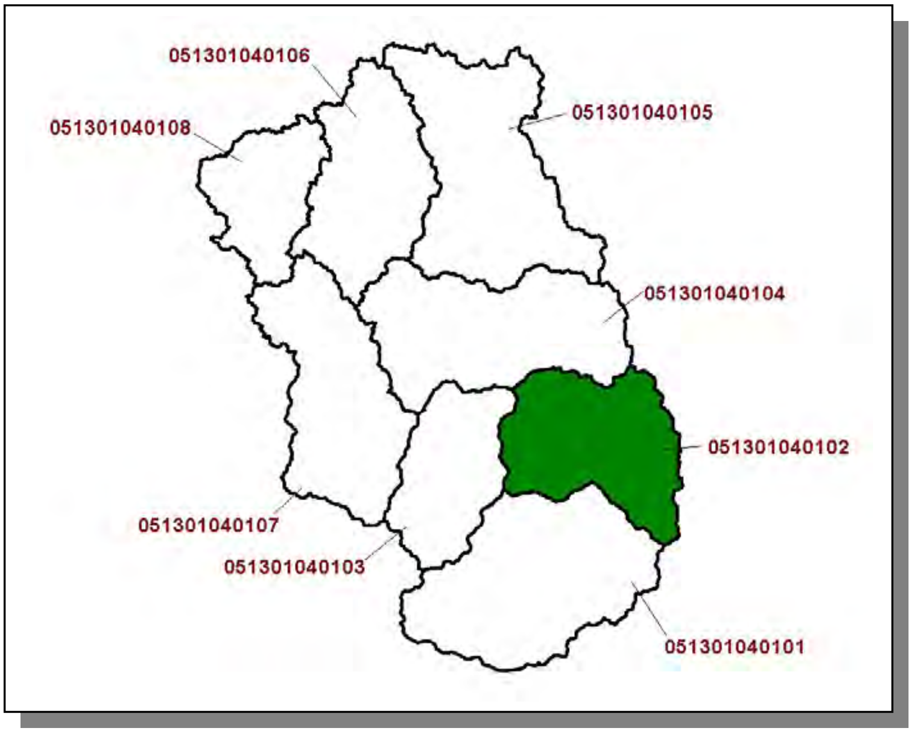


Figure 4-12. Location of Subwatershed 051301040102. *All HUC-12 subwatershed boundaries are shown for reference.*

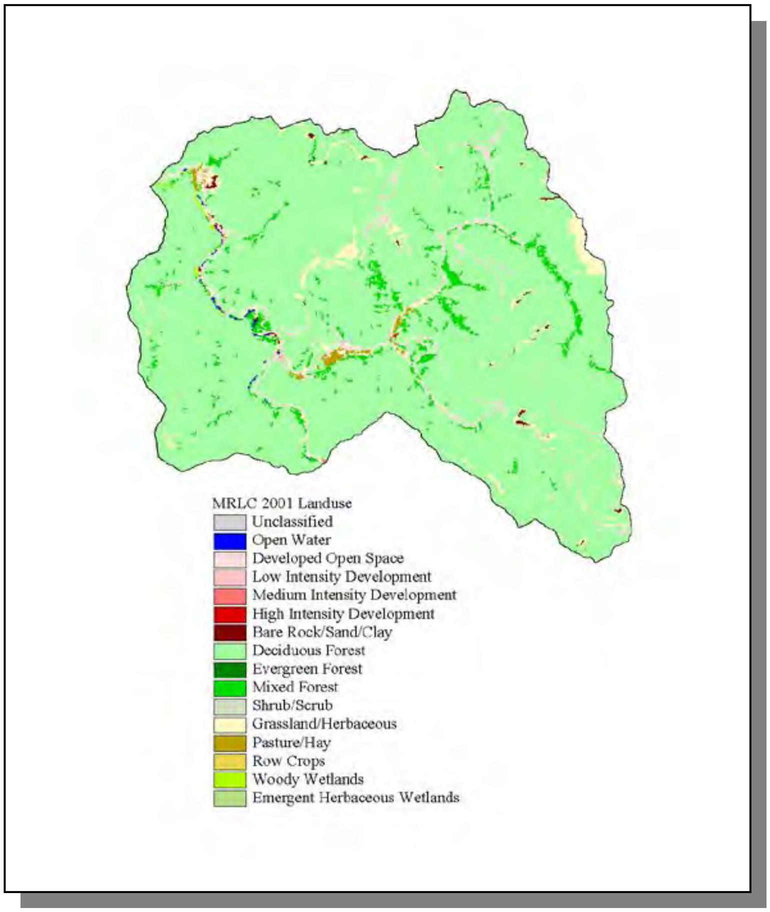


Figure 4-13. Illustration of Land Use Distribution in Subwatershed 051301040102.

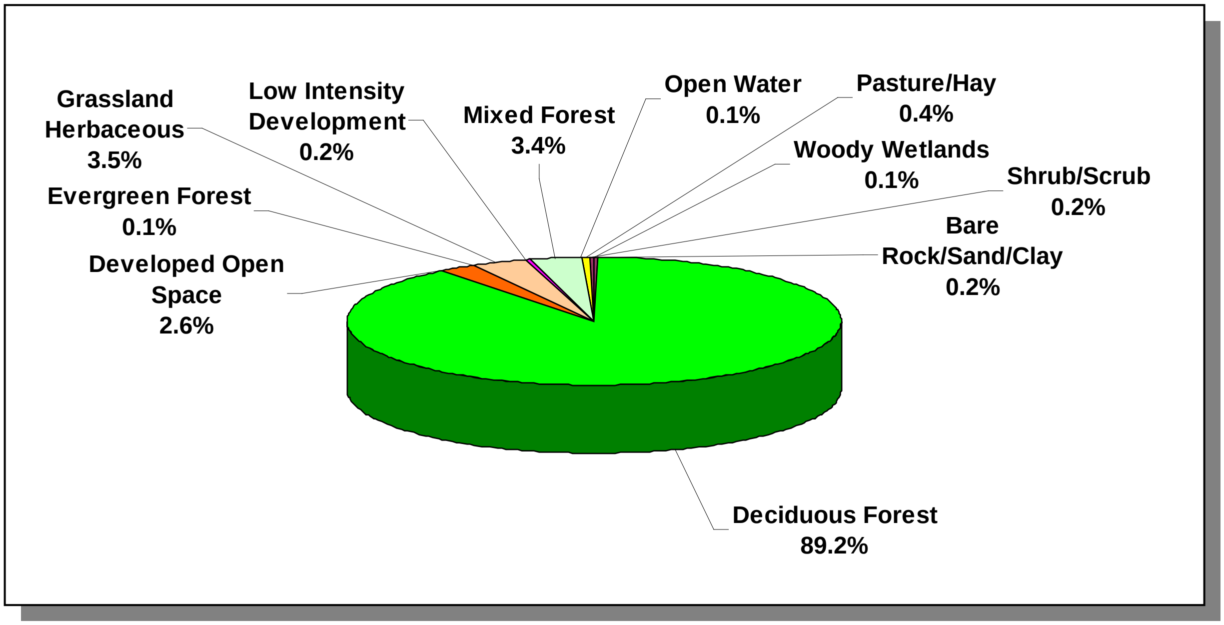


Figure 4-14. Land Use Distribution in Subwatershed 051301040102. *More information is provided in Appendix IV.*

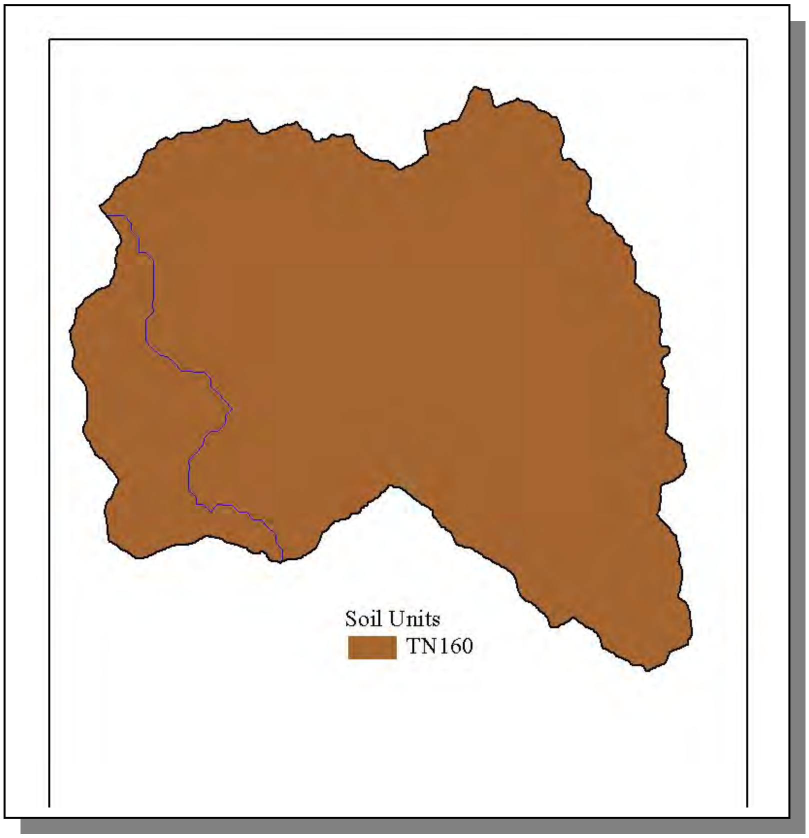


Figure 4-15. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040102.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN160	0.00	B	2.69	5.36	Loam	0.25

Table 4-8. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040102. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Anderson	68,250	71,498	71,330	0.27	184	193	193	4.9
Campbell	35,079	37,878	39,854	8.50	2,981	3,219	3,386	13.6
Scott	18,358	19,816	21,127	0.62	114	123	131	14.9
Total	**121,687**	**129,192**	**132,311**		**3,279**	**3,535**	**3,710**	**13.1**

Table 4-9. Population Estimates in Subwatershed 051301040102.

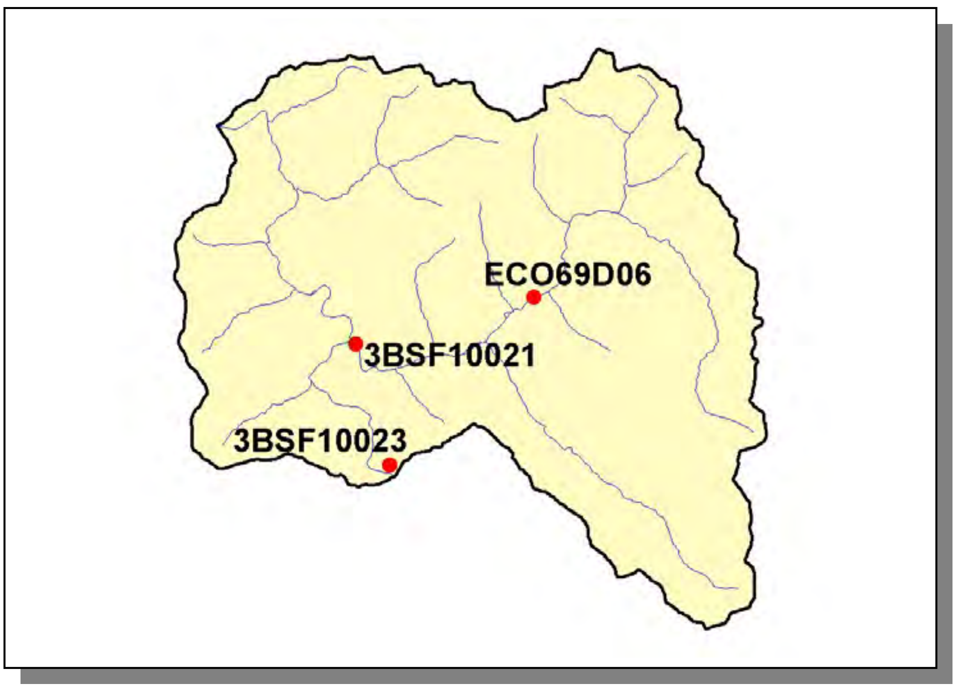


Figure 4-16. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301040102. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.A.ii.a. Point Source Contributions.

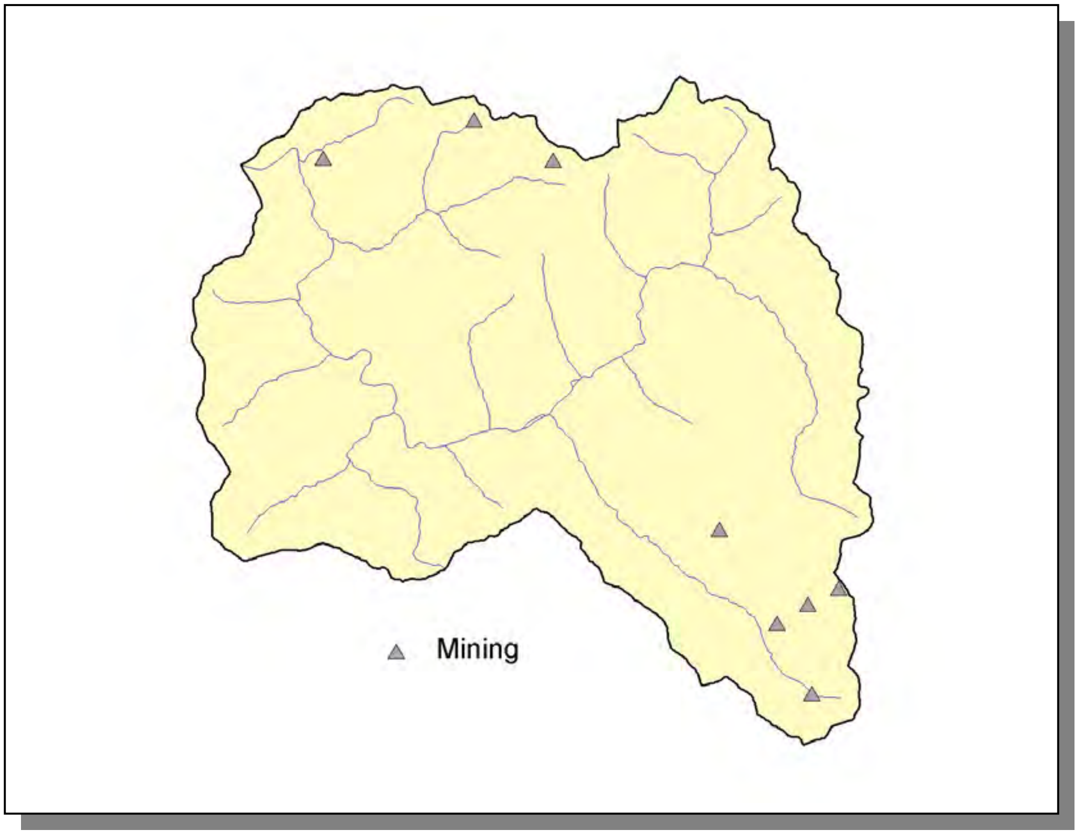


Figure 4-17. Location of Permits Issued in Subwatershed 051301040102. *More information, including the names of facilities, is provided in Appendix IV.*

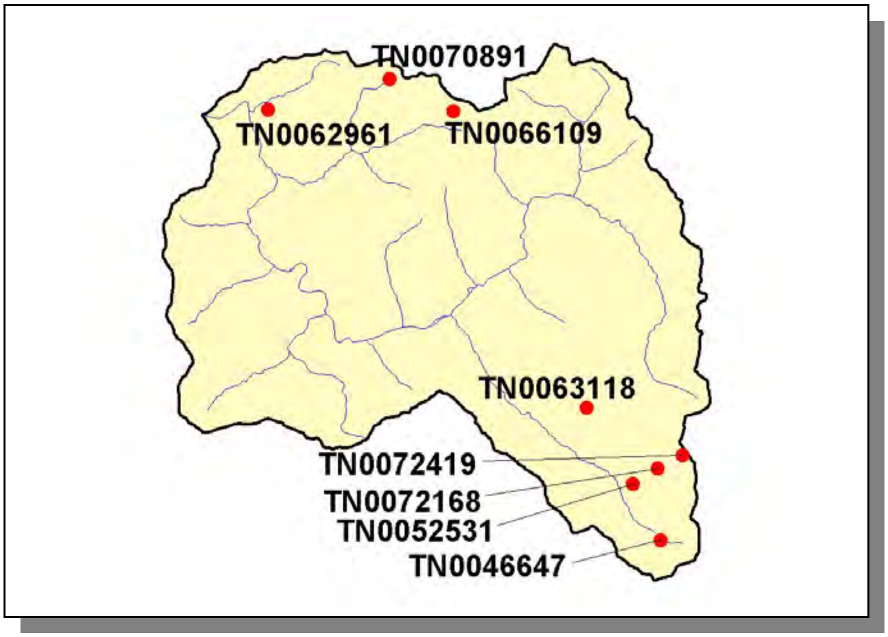


Figure 4-18. Location of Active Mining Sites in Subwatershed 051301040102. *More information, including the names of mining operations, is provided in Appendix IV.*

4.2.A.ii.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS			
Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)
69	131	<5	2,304

Table 4-10. Summary of Livestock Count Estimates in Subwatershed 051301040102. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* **"***Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Chickens (Layers)	Hogs	Sheep
Anderson	4,449	9,458	335		769		135
Campbell	4,083	7,684	66		8	14	
Scott	2,177	4,447	216	1,989,506	196	17	74

Table 4-11. Summary of Livestock Count Estimates in Anderson, Campbell, and Scott Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* **"***Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Anderson	124.0	124.0	2.6	6.2
Campbell	250.3	250.2	2.6	10.6
Scott	300.3	300.3	5.5	21.4

Table 4-12. Forest Acreage and Annual Removal Rates (1987-1994) in Anderson, Campbell, and Scott Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	1.63
Grass (Hayland)	1.76
Legumes, Grass (Hayland)	0.50
Legumes (Hayland)	1.07
Grass, Forbs, Legumes (Mixed Pasture)	2.56
Tobacco (Row Crops)	14.82
Other Vegetable and Truck Crops	3.52
Non-Agricultural Land Use	0
Other Land in Farms	0.23
Farmsteads and Ranch Headquarters	0.09

Table 4-13. Annual Estimated Total Soil Loss in Subwatershed 051301040102.

4.2.A.iii. 051301040103 (Smokey Creek).

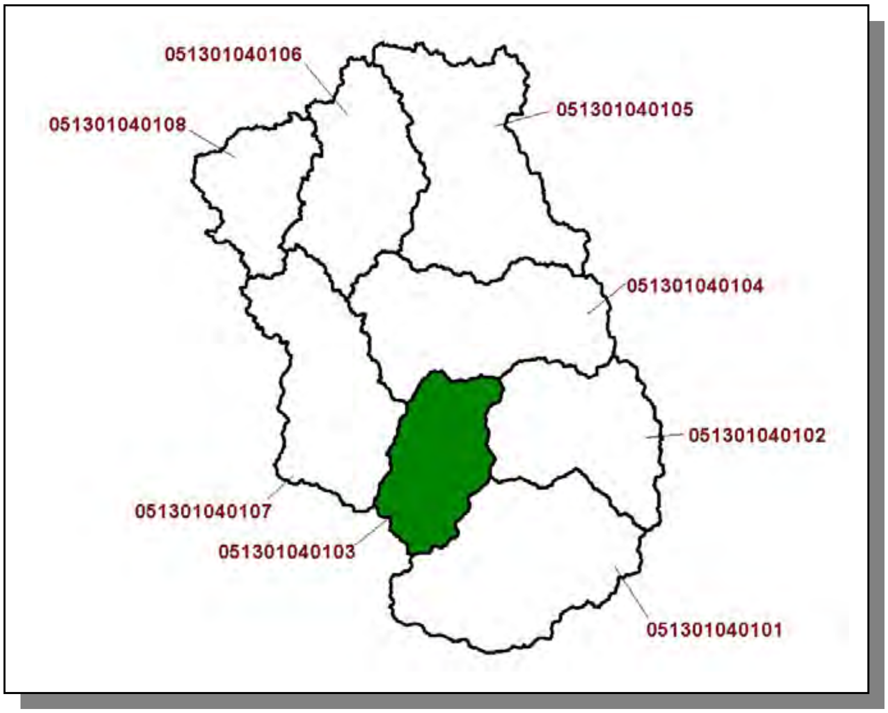


Figure 4-19. Location of Subwatershed 051301040103. *All HUC-12 subwatershed boundaries are shown for reference.*

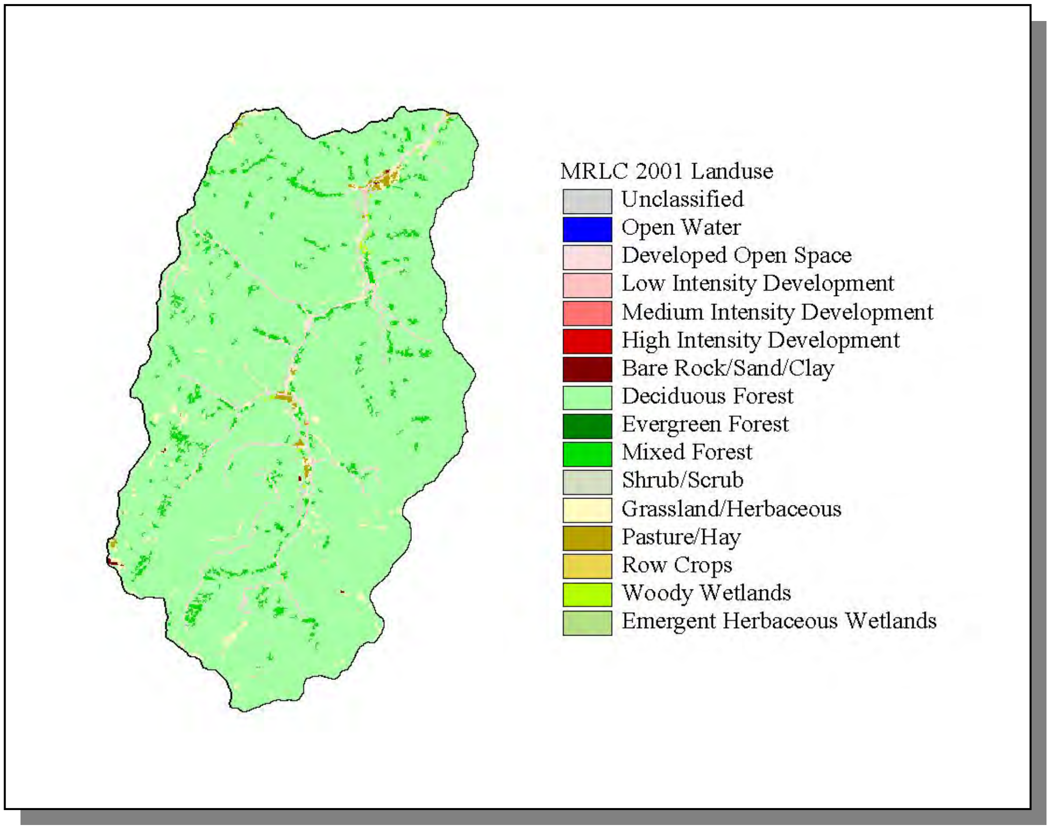


Figure 4-20. Illustration of Land Use Distribution in Subwatershed 051301040103.

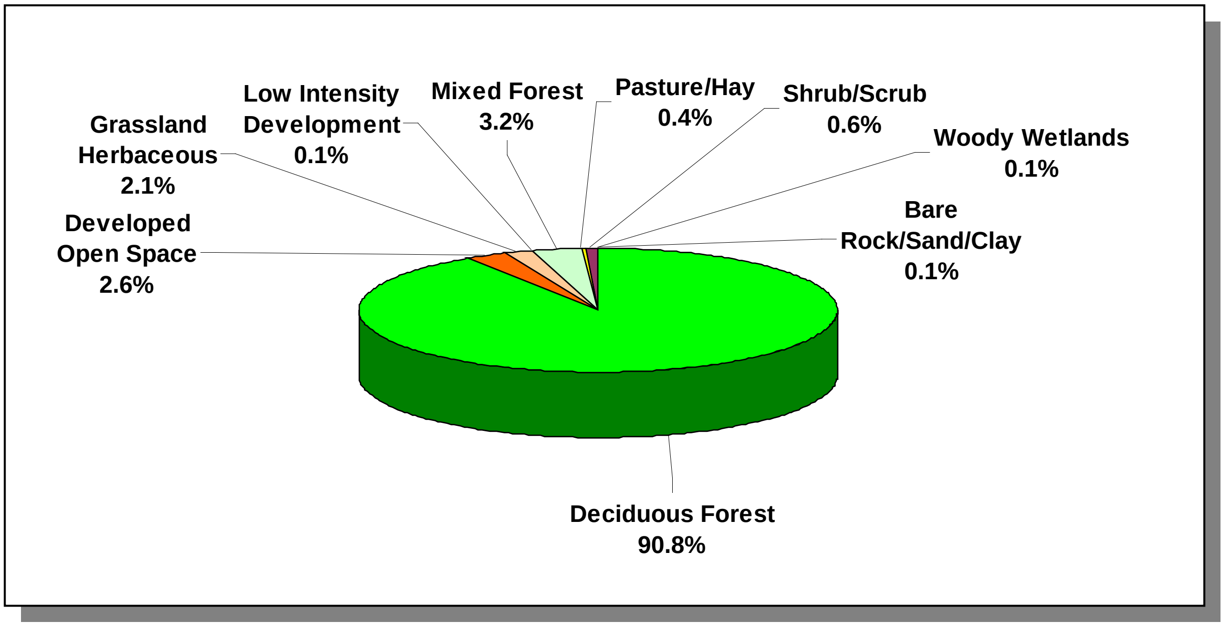


Figure 4-21. Land Use Distribution in Subwatershed 051301040103. *More information is provided in Appendix IV.*

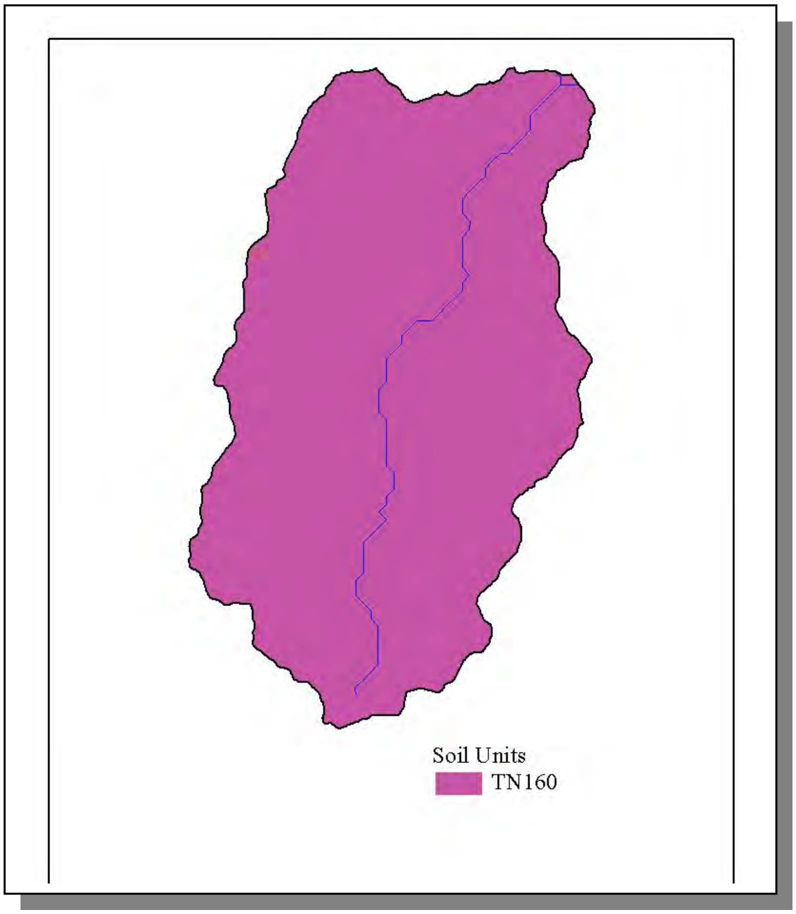


Figure 4-22. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040103.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN160	0.00	B	2.69	5.36	Loam	0.25

Table 4-14. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040103. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Anderson	68,250	71,498	71,330	0.36	247	259	258	4.5
Campbell	35,079	37,878	39,854	0.01	4	4	5	25.0
Morgan	17,300	18,521	19,757	0.09	16	17	18	12.5
Scott	18,358	19,816	21,127	5.86	1,076	1,161	1,238	15.1
Total	**138,987**	**147,713**	**152,068**		**1,343**	**1,441**	**1,519**	**13.1**

Table 4-15. Population Estimates in Subwatershed 051301040103.

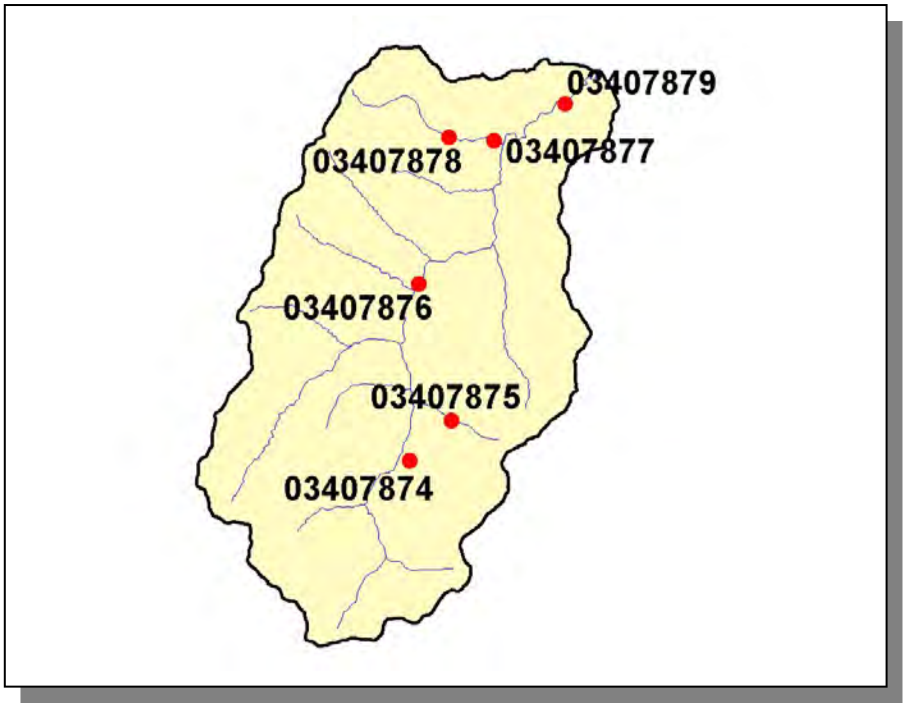


Figure 4-23. Location of Historical Streamflow Data Collection Sites in Subwatershed 051301040103. *More information is provided in Appendix IV.*

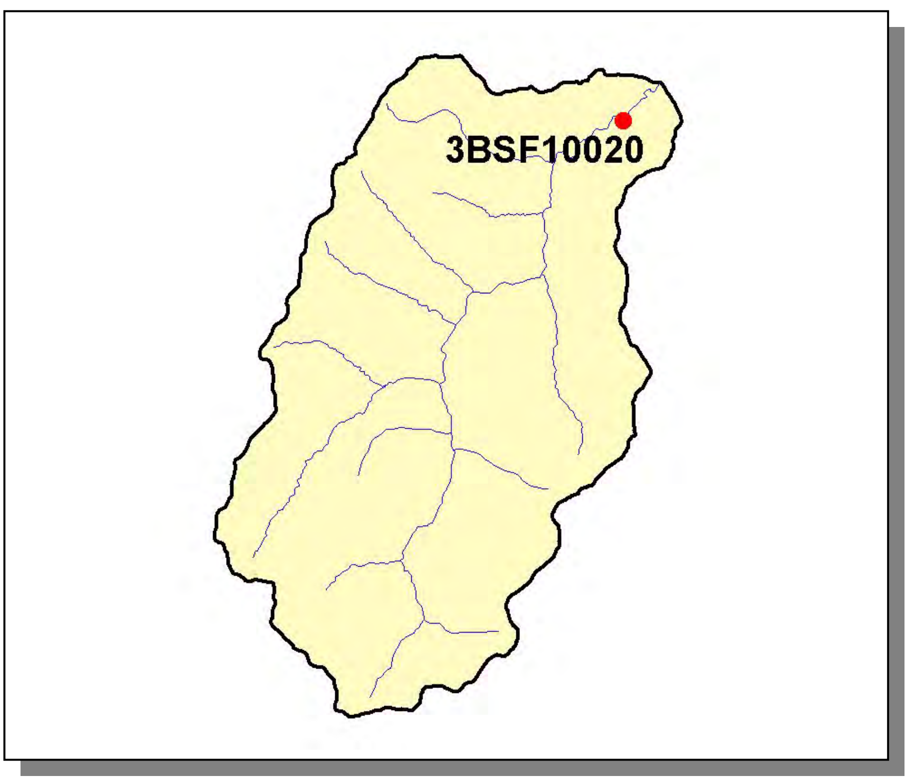


Figure 4-24. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301040103. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.A.iii.a. Point Source Contributions.

Figure 4-25. Location of Permits Issued in Subwatershed 051301040103. *More information, including the names of facilities, is provided in Appendix IV.*

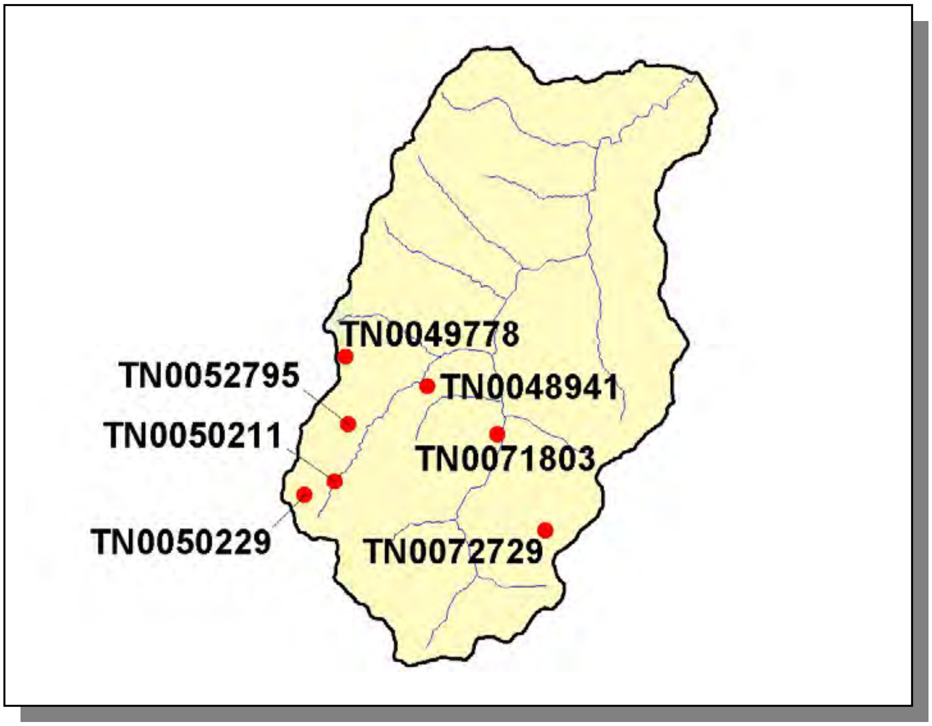


Figure 4-26. Location of Active Mining Sites in Subwatershed 051301040103. *More information, including the names of mining operations, is provided in Appendix IV.*

4.2.A.iii.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS				
Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Sheep
26	53	<5	22,092	<5

Table 4-16. Summary of Livestock Count Estimates in Subwatershed 051301040103. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Chickens (Layers)	Hogs	Sheep
Anderson	4,449	9,458	335		769		135
Campbell	4,083	7,684	66		8	14	
Morgan	4,697	8,853	251	1,501,559	194	83	35
Scott	2,177	4,447	216	1,989,506	196	17	74

Table 4-17. Summary of Livestock Count Estimates in Anderson, Campbell, Morgan, and Scott Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Anderson	124.0	124.0	2.6	6.2
Campbell	250.3	250.2	2.6	10.6
Morgan	287.8	276.2	3.5	10.9
Scott	300.3	300.3	5.5	21.4

Table 4-18. Forest Acreage and Annual Removal Rates (1987-1994) in Anderson, Campbell, Morgan, and Scott Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.37
Grass (Hayland)	0.79
Legumes (Hayland)	1.07
Legumes, Grass (Hayland)	2.41
Grass, Forbs, Legumes (Mixed Pasture)	0.62
Corn (Row Crops)	7.18
Tobacco (Row Crops)	2.23
Other Vegetable and Truck Crops	11.67
Other Land in Farms	0.23
Farmsteads and Ranch Headquarters	0.12

Table 4-19. Annual Estimated Total Soil Loss in Subwatershed 051301040103.

4.2.A.iv. 051301040104 (New River).

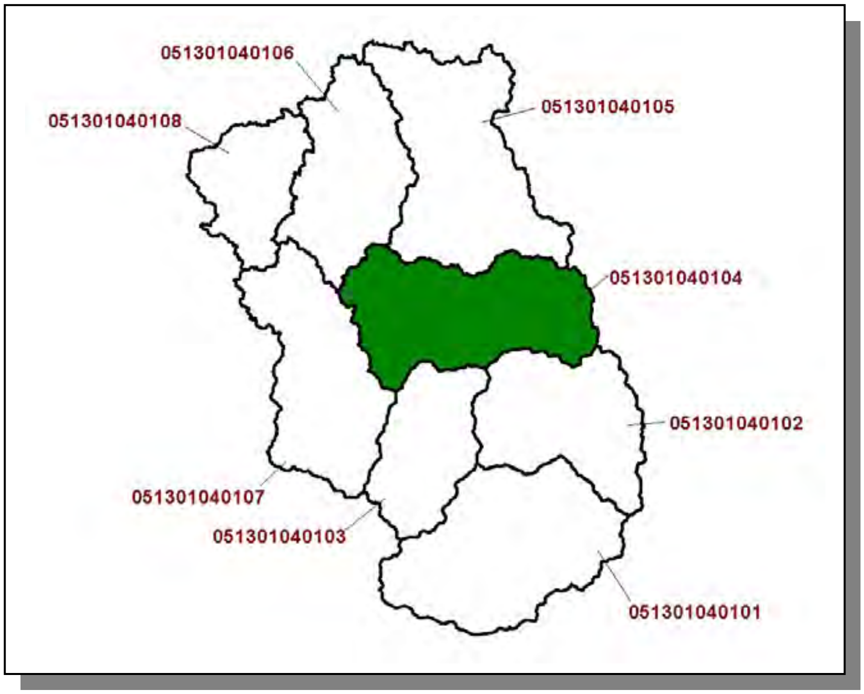


Figure 4-27. Location of Subwatershed 051301040104. *All HUC-12 subwatershed boundaries are shown for reference.*

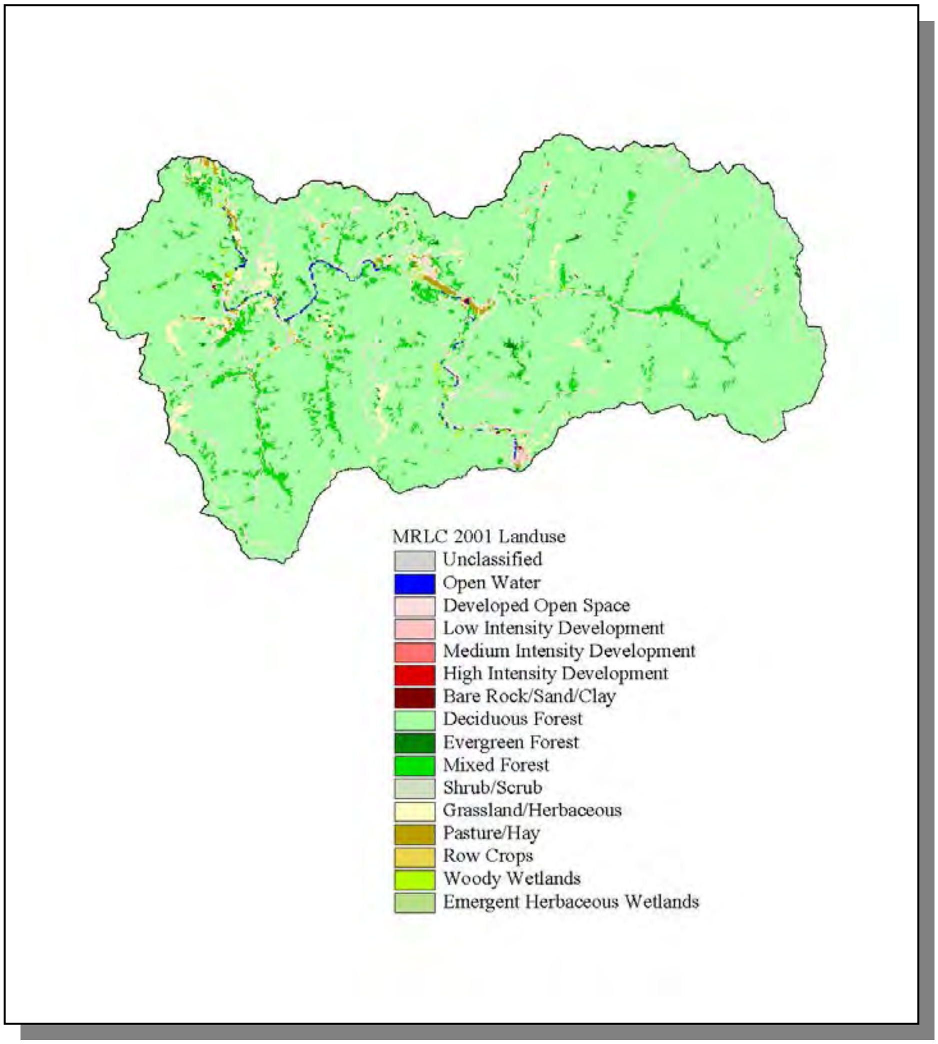


Figure 4-28. Illustration of Land Use Distribution in Subwatershed 051301040104.

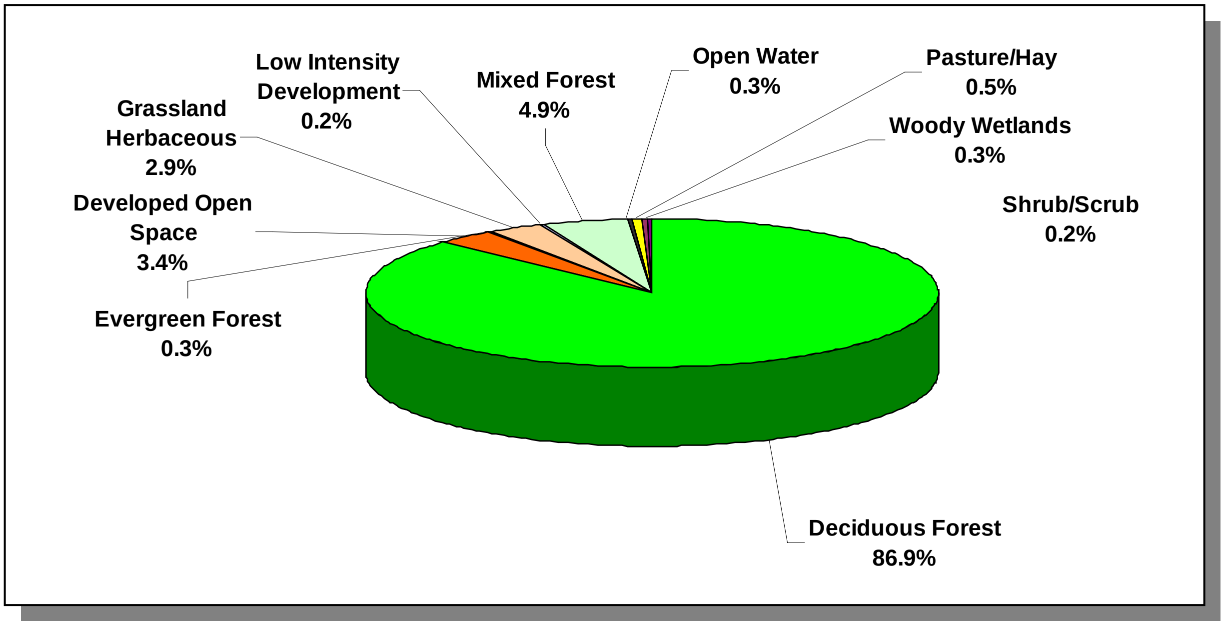


Figure 4-29. Land Use Distribution in Subwatershed 051301040104. *More information is provided in Appendix IV.*

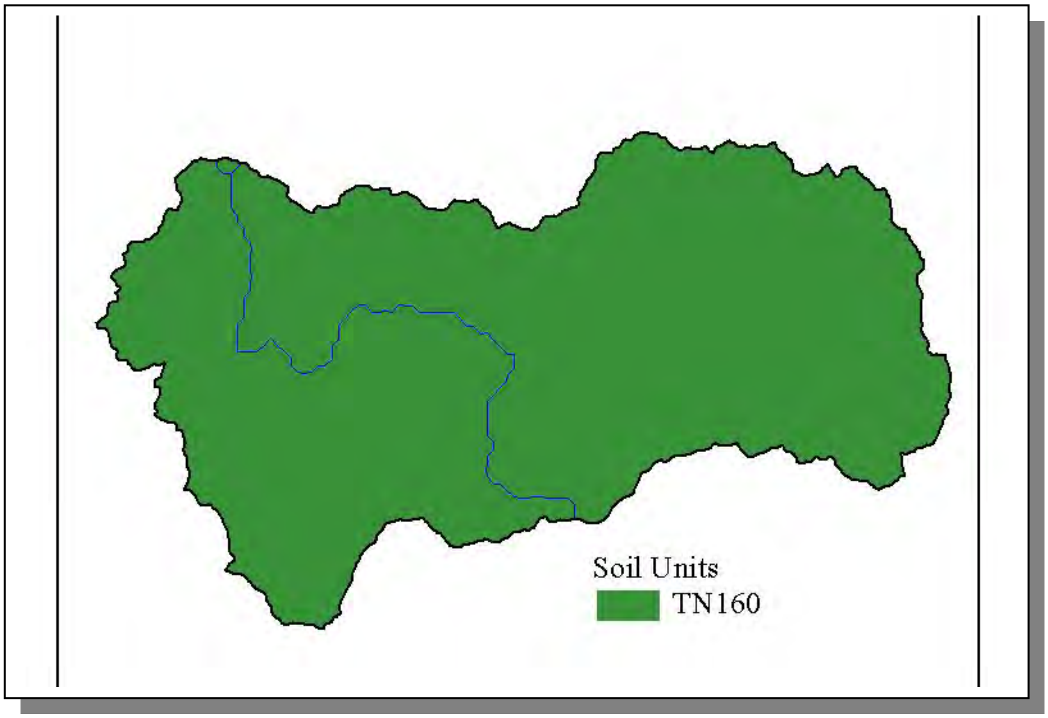


Figure 4-30. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040104.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN160	0.00	B	2.69	5.36	Loam	0.25

Table 4-20. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040104. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Campbell	35,079	37,878	39,854	2.88	1,011	1,091	1,148	13.6
Scott	18,358	19,816	21,127	8.24	1,512	1,632	1,740	15.1
Total	**53,437**	**57,694**	**60,981**		**2,523**	**2,723**	**2,888**	**14.5**

Table 4-21. Population Estimates in Subwatershed 051301040104.

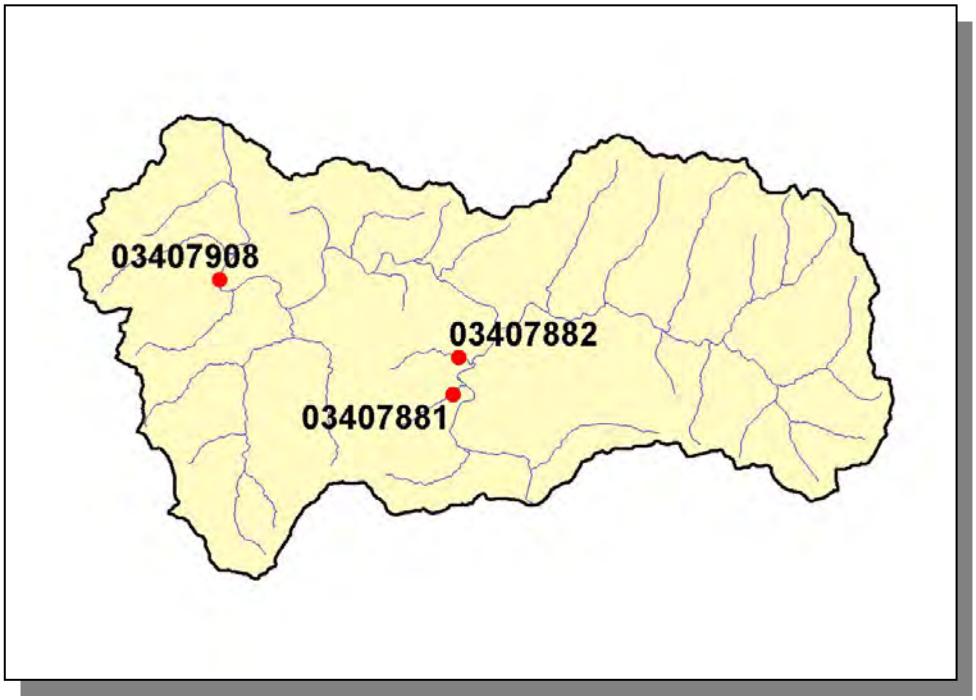


Figure 4-31. Location of Historical Streamflow Data Collection Sites in Subwatershed 051301040104. *More information is provided in Appendix IV.*

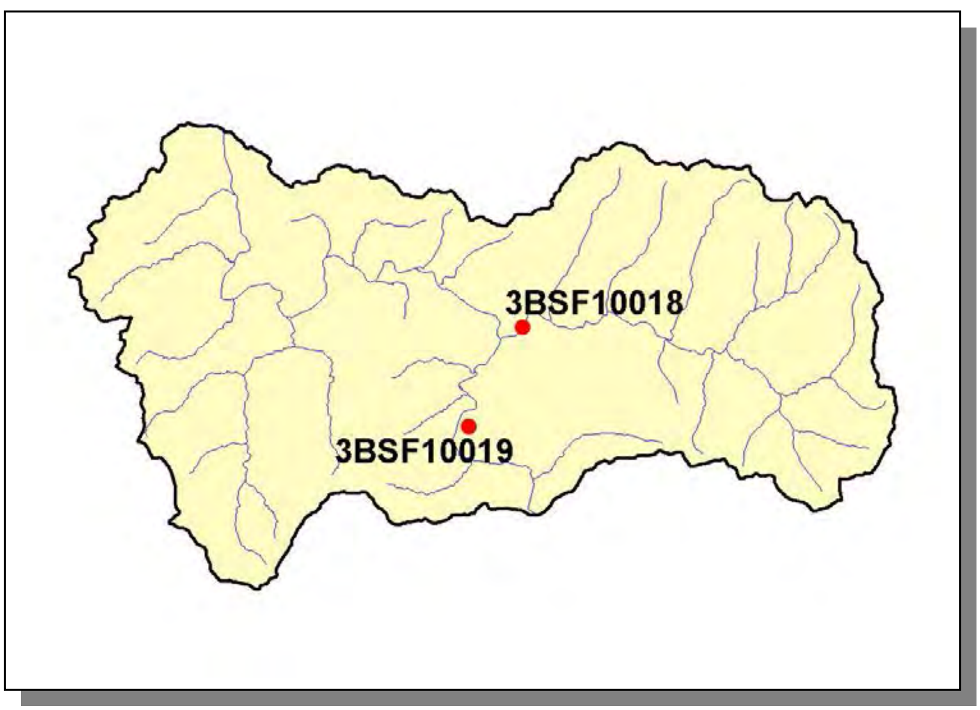


Figure 4-32. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301040104. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.A.iv.a. Point Source Contributions.

Figure 4-33. Location of Permits Issued in Subwatershed 051301040104. *More information, including the names of facilities, is provided in Appendix IV.*

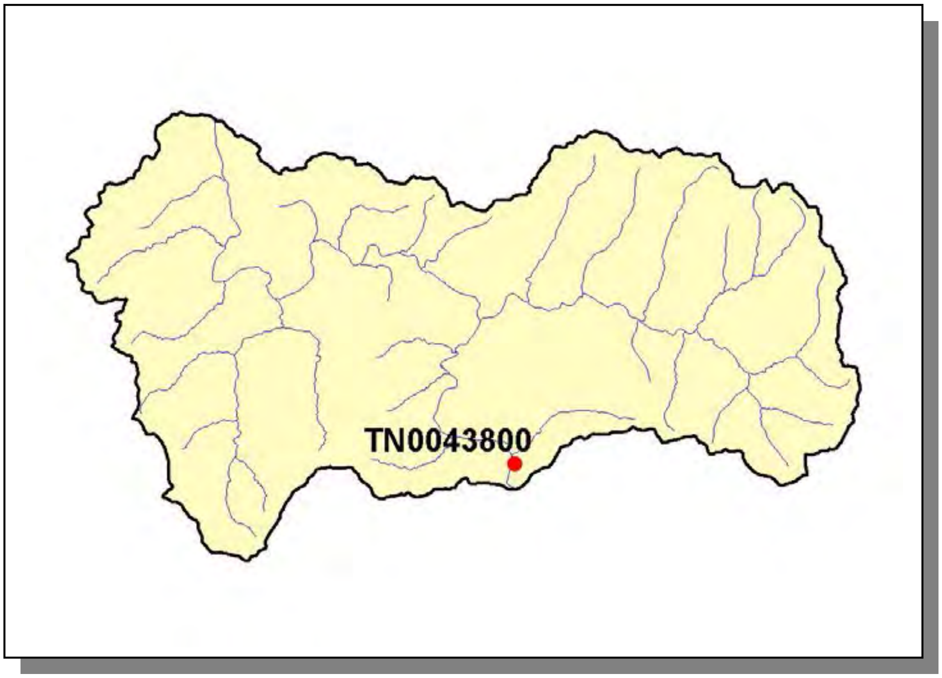


Figure 4-34. Location of Active Mining Sites in Subwatershed 051301040104. *More information, including the names of mining operations, is provided in Appendix IV.*

4.2.A.iv.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS				
Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Sheep
53	107	<5	38,986	<5

Table 4-22. Summary of Livestock Count Estimates in Subwatershed 051301040104. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Chickens (Layers)	Hogs	Sheep
Campbell	4,083	7,684	66		8	14	
Scott	2,177	4,447	216	1,989,506	196	17	74

Table 4-23. Summary of Livestock Count Estimates in Campbell and Scott Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Campbell	250.3	250.2	2.6	10.6
Scott	300.3	300.3	5.5	21.4

Table 4-24. Forest Acreage and Annual Removal Rates (1987-1994) in Campbell and Scott Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.67
Grass (Hayland)	1.78
Legumes, Grass (Hayland)	0.44
Grass, Forbs, Legumes (Mixed Pasture)	1.1
Tobacco (Row Crops)	15.11
Other Vegetable Truck Crops	3.33
Farmsteads and Ranch Headquarters	0.08

Table 4-25. Annual Estimated Total Soil Loss in Subwatershed 051301040104.

4.2.A.v. 051301040105 (Buffalo Creek).

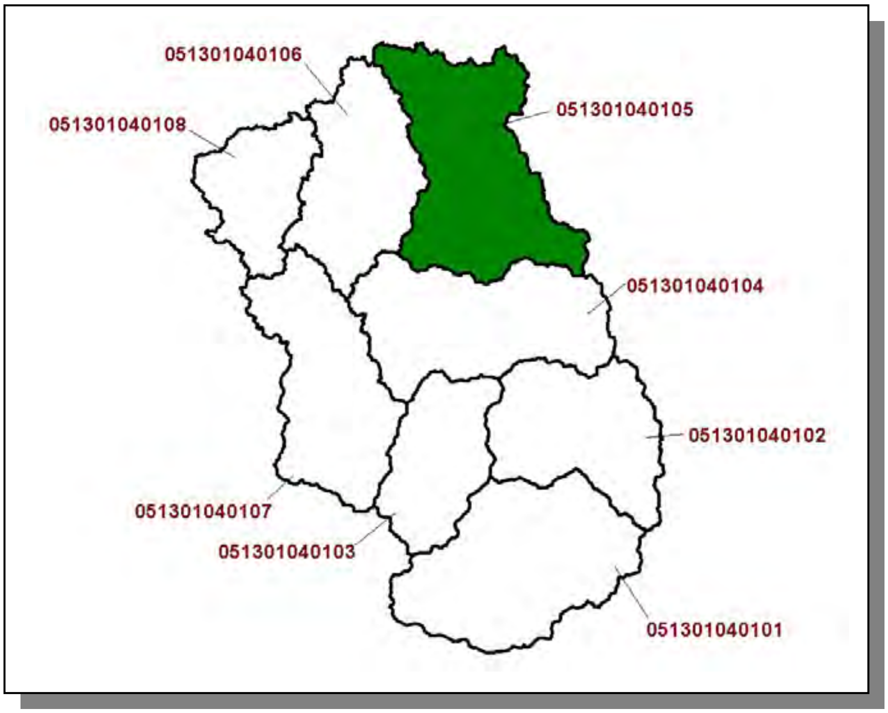


Figure 4-35. Location of Subwatershed 051301040105. *All HUC-12 subwatershed boundaries are shown for reference.*

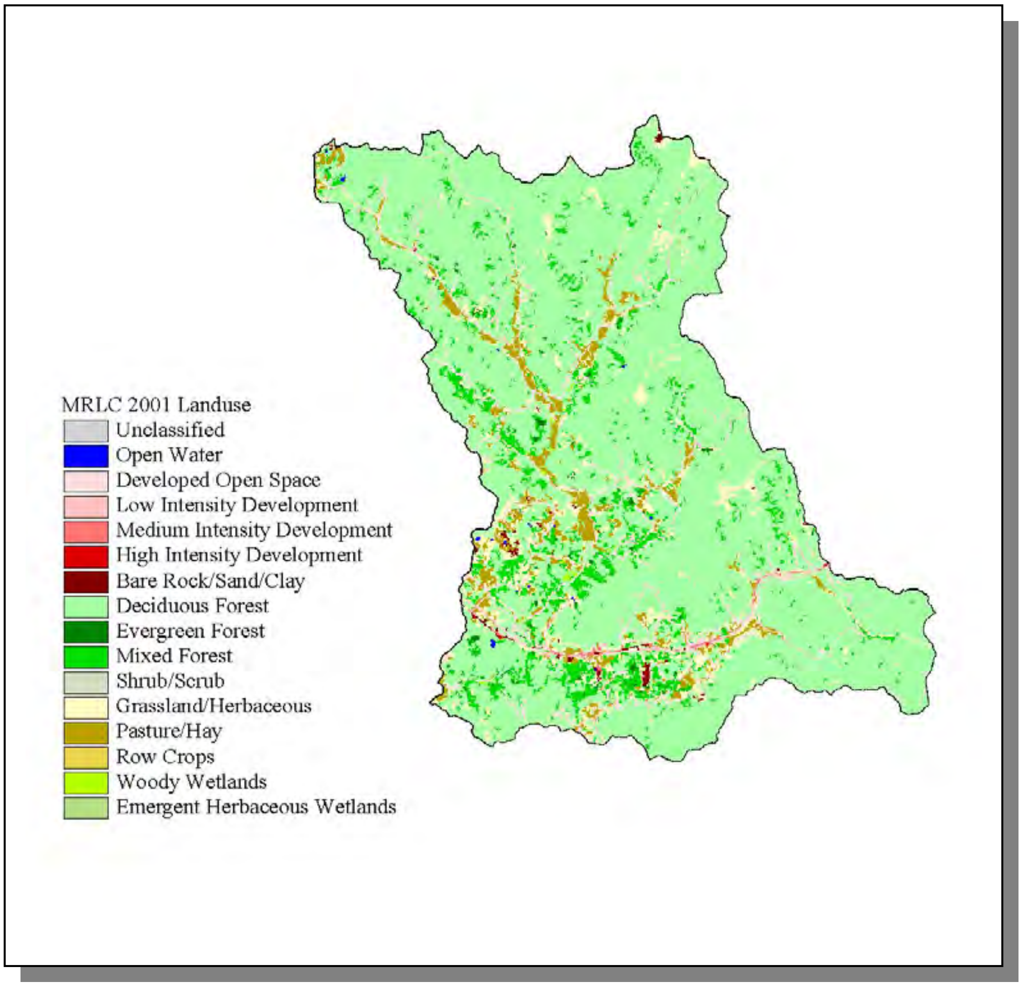


Figure 4-36. Illustration of Land Use Distribution in Subwatershed 051301040105.

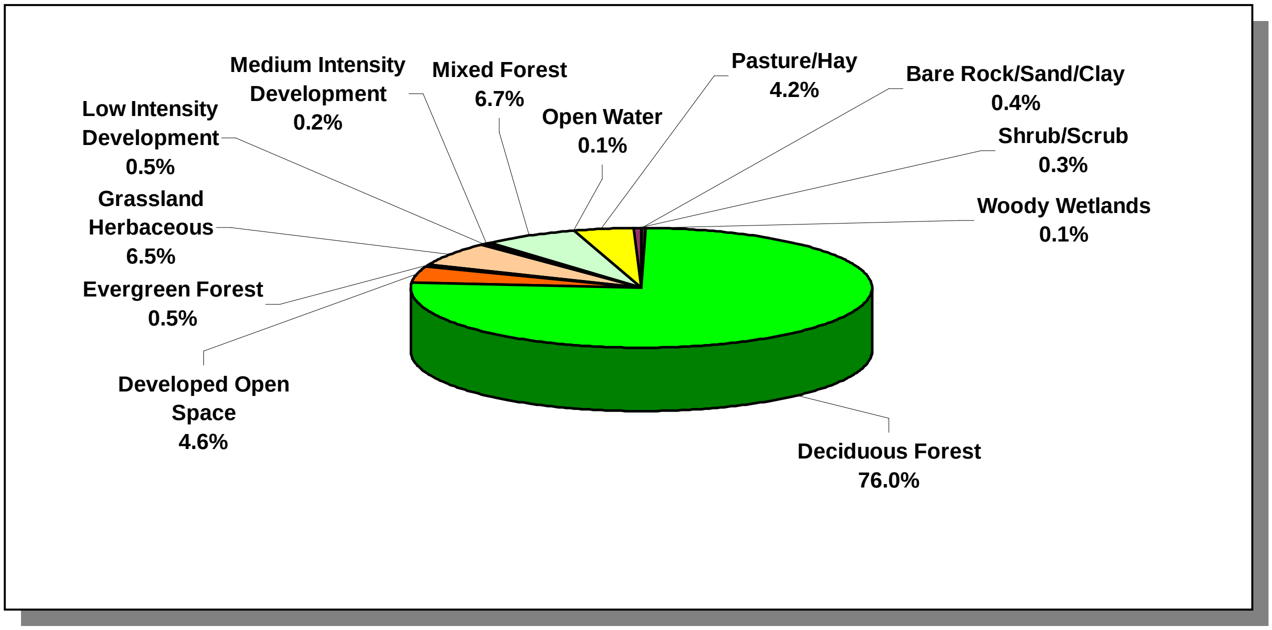


Figure 4-37. Land Use Distribution in Subwatershed 051301040105. *More information is provided in Appendix IV.*

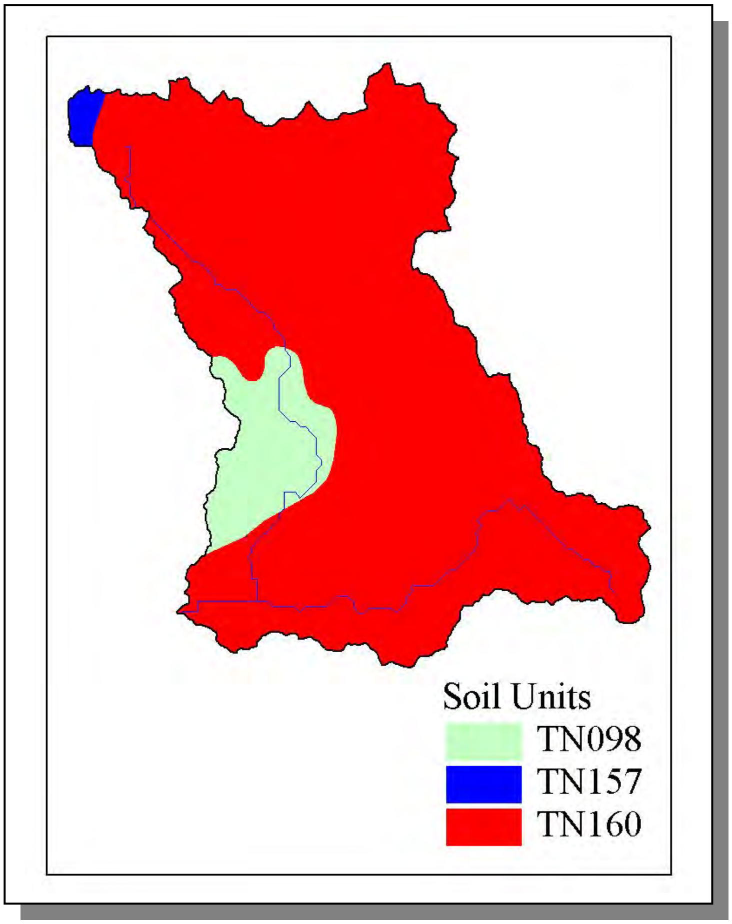


Figure 4-38. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040105.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN098	1.00	C	3.98	4.82	Loam	0.32
TN157	0.00	B	2.38	4.62	Loam	0.28
TN160	0.00	B	2.69	5.36	Loam	0.25

Table 4-26. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040105. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Campbell	35,079	37,878	39,854	1.1	386	417	439	13.7
Scott	18,358	19,816	21,127	10.97	2,014	2,174	2,318	15.1
Total	53,437	57,694	60,981		2,400	2,591	2,757	14.9

Table 4-27. Population Estimates in Subwatershed 051301040105.

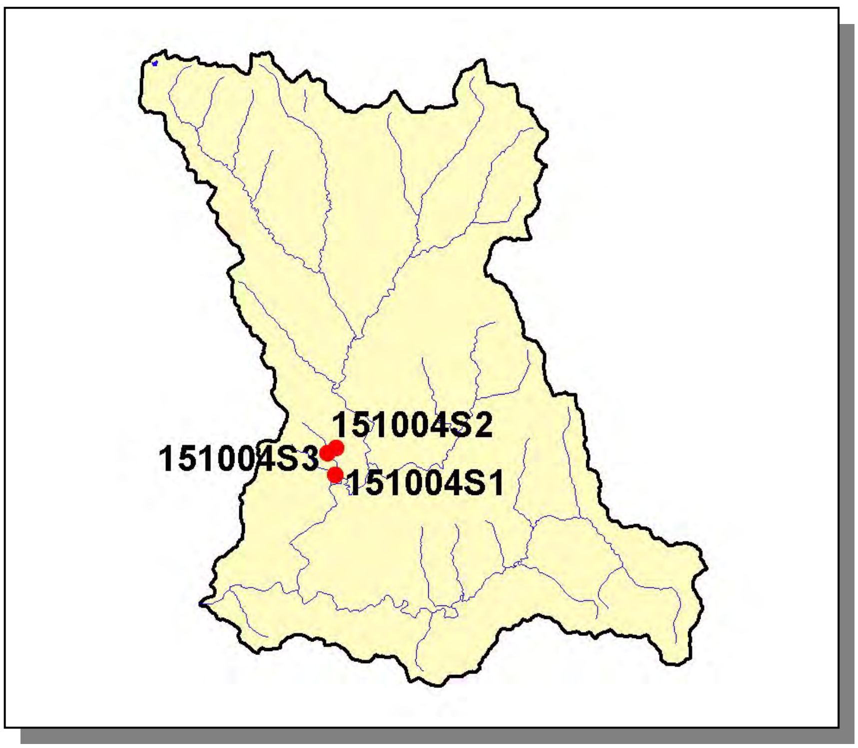


Figure 4-39. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301040105. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.A.v.a. Point Source Contributions.

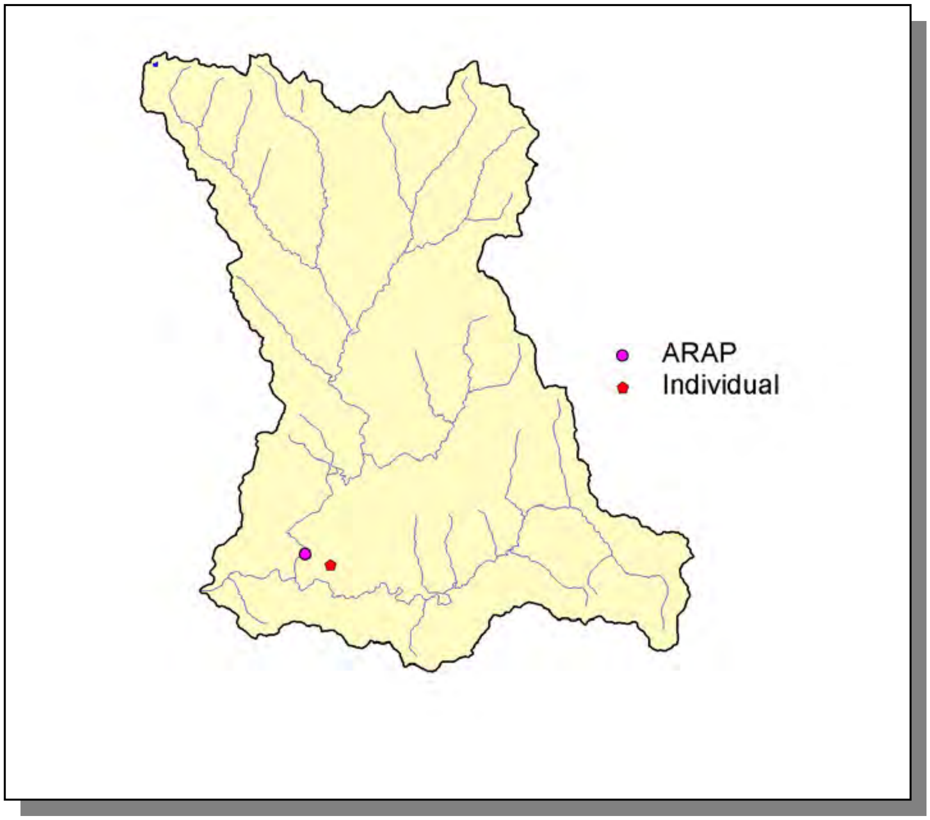


Figure 4-40. Location of Permits Issued in Subwatershed 051301040105. *More information, including the names of facilities, is provided in Appendix IV.*

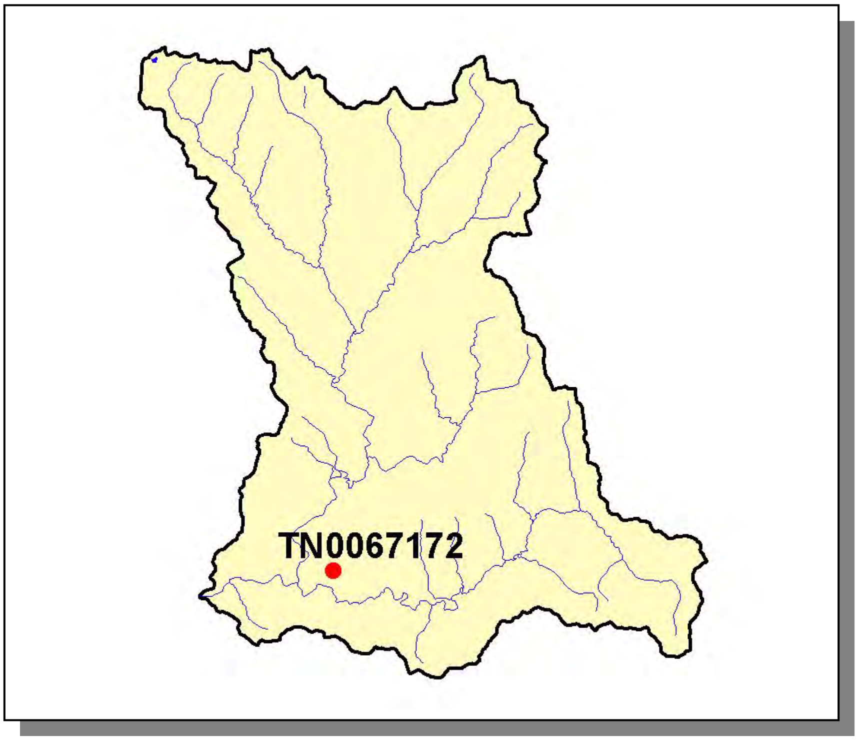


Figure 4-41. Location of Active NPDES Sites in Subwatershed 051301040105. *More information, including the names of facilities, is provided in Appendix IV.*

Figure 4-42. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 051301040105. *More information is provided in Appendix IV.*

4.2.v.a.i. Dischargers to Water Bodies Listed on the 2004 303(d) List

There is one NPDES facility discharging to water bodies listed on the 2004 303(d) list in Subwatershed 051301040105:

- TN0067172 (Fairview Elementary School) discharges to an unnamed tributary @ RM 0.5 to Straight Fork @ RM 2.0

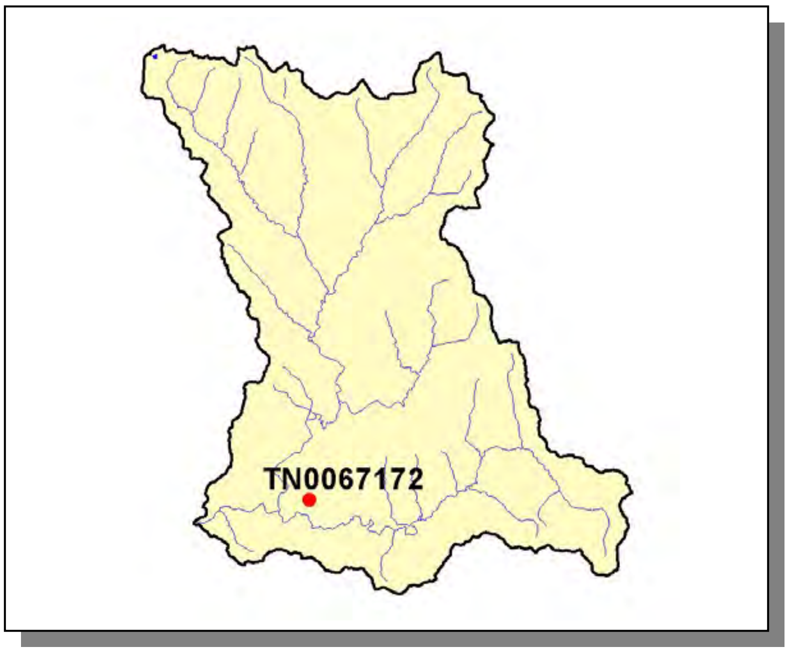


Figure 4-43. Location of NPDES Dischargers to Water Bodies Listed on the 2004 303(d) List in Subwatershed 051301040105. *More information, including the names of facilities, is provided in Appendix IV.*

Permit #	3Q2	1Q10	3Q10	3Q20	7Q10
TN0067172	0.00	na	0.00	0.00	0.00

Table 4-28. Receiving Stream Low Flow Information for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051301040105. *Data are in cubic feet per second (CFS). Data were obtained from the USGS web application StreamStats at http://water.usgs.gov/osw/streamstats/. (na, data not available)*

PERMIT #	$CBOD_5$	*E.coli*	FECAL COLIFORM	NH_3	TRC	TSS	SETTLEABLE SOLIDS	DO	pH
TN0067172	X	X	X	X	X	X	X	X	X

Table 4-29. Parameters Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051301040105. *$CBOD_5$, Carbonaceous Biochemical Oxygen Demand (5-Day); TRC, Total Residual Chlorine; TSS, Total Suspended Solids.*

4.2.A.v.b. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
282	576	27	<5	251,615	<5	9

Table 4-30. Summary of Livestock Count Estimates in Subwatershed 051301040105. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Chickens (Layers)	Hogs	Sheep
Campbell	4,083	7,684	66		8	14	
Scott	2,177	4,447	216	1,989,506	196	17	74

Table 4-31. Summary of Livestock Count Estimates in Campbell and Scott Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Campbell	250.3	250.2	2.6	10.6
Scott	300.3	300.3	5.5	21.4

Table 4-32. Forest Acreage and Annual Removal Rates (1987-1994) in Campbell and Scott Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.44
Grass (Hayland)	1.78
Legumes, Grass (Hayland)	0.44
Grass, Forbs, Legumes (Mixed Pasture)	0.76
Tobacco (Row Crops)	15.11
Other Vegetable and Truck Crop	3.33
Farmsteads and Ranch Headquarters	0.09

Table 4-33. Annual Estimated Total Soil Loss in Subwatershed 051301040105.

4.2.A.vi. 051301040106 (New River).

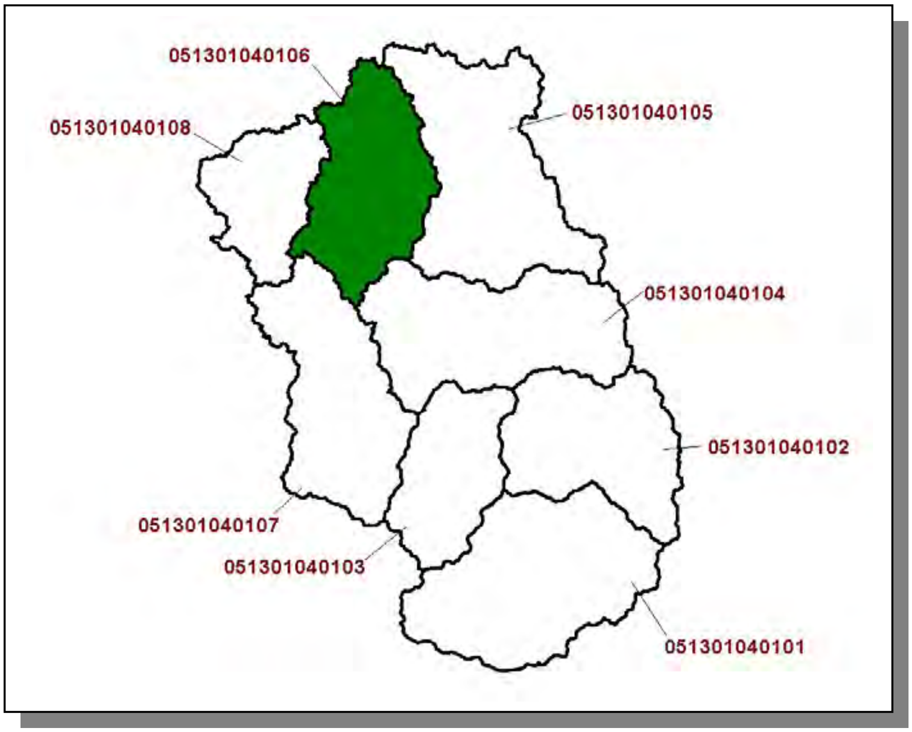


Figure 4-44. Location of Subwatershed 051301040106. *All HUC-12 subwatershed boundaries are shown for reference.*

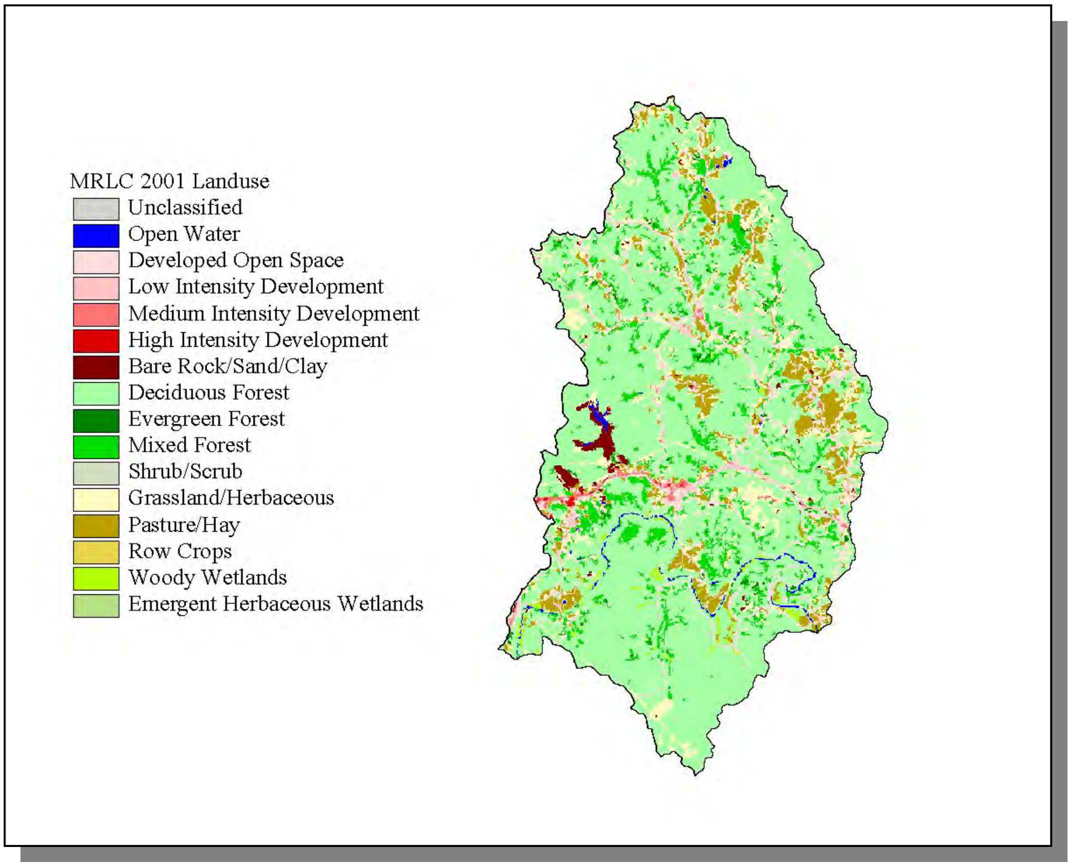


Figure 4-45. Illustration of Land Use Distribution in Subwatershed 051301040106.

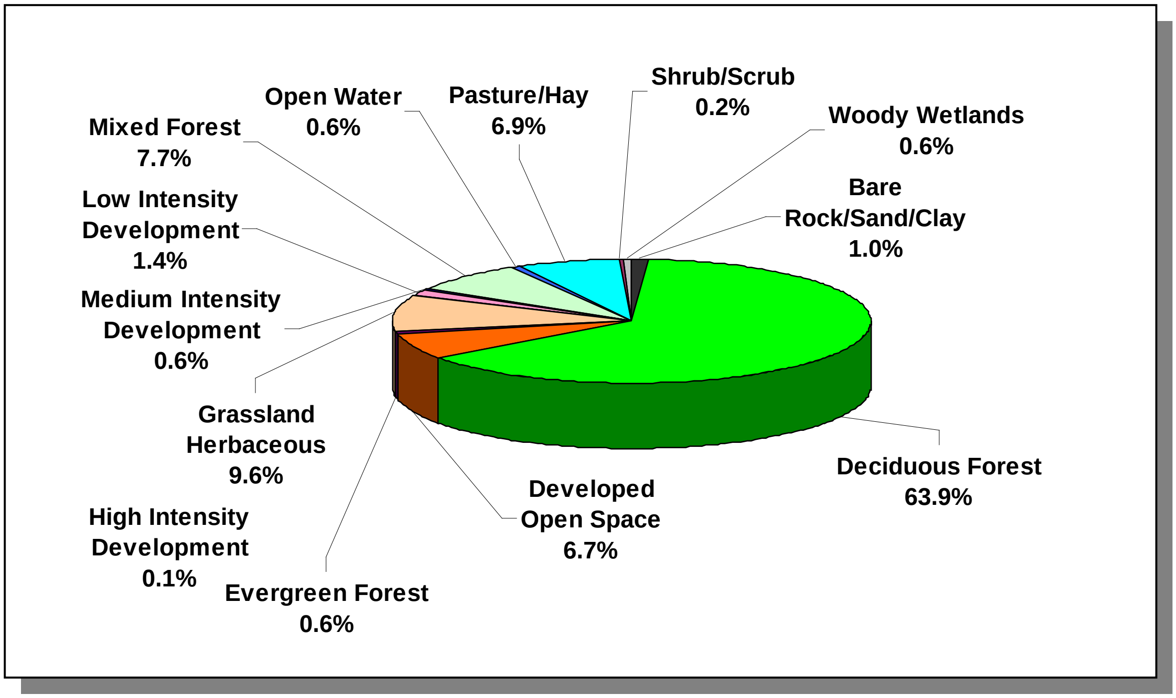


Figure 4-46. Land Use Distribution in Subwatershed 051301040106. *More information is provided in Appendix IV.*

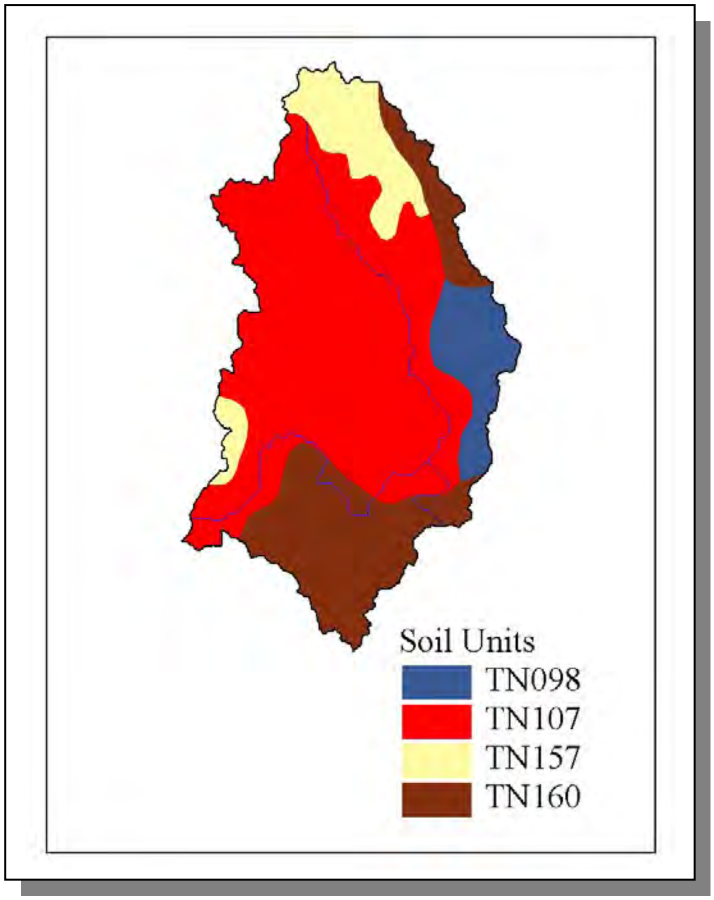


Figure 4-47. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040106.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN098	1.00	C	3.98	4.82	Loam	0.32
TN107	1.00	C	6.34	4.84	Loam	0.28
TN157	0.00	B	2.38	4.62	Loam	0.28
TN160	0.00	B	2.69	5.36	Loam	0.25

Table 4-34. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040106. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Scott	18,358	19,816	21,127	8.37	1,536	1,658	1,768	15.1

Table 4-35. Population Estimates in Subwatershed 051301040106.

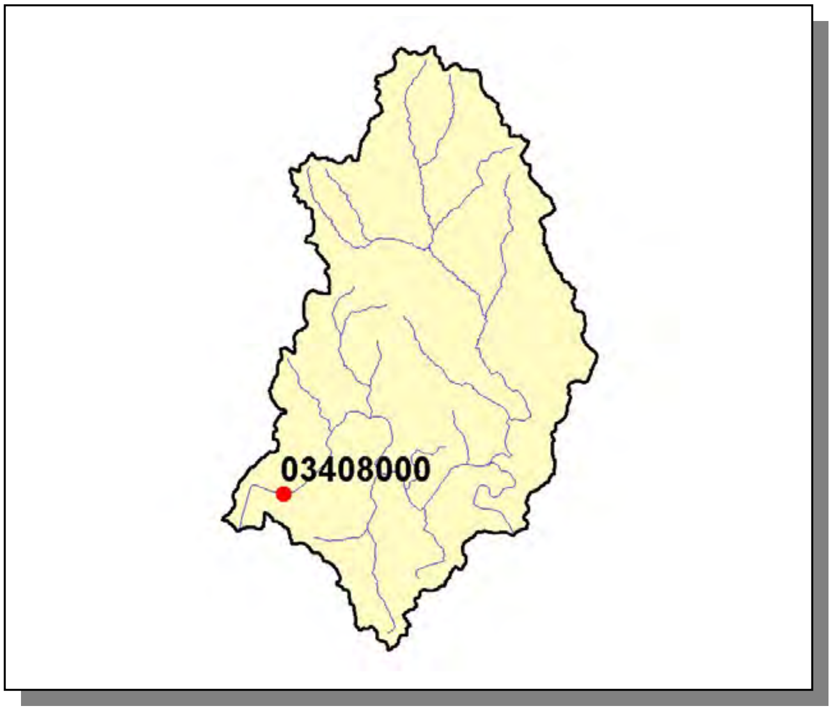


Figure 4-48. Location of Historical Streamflow Data Collection Sites in Subwatershed 051301040106. *More information is provided in Appendix IV.*

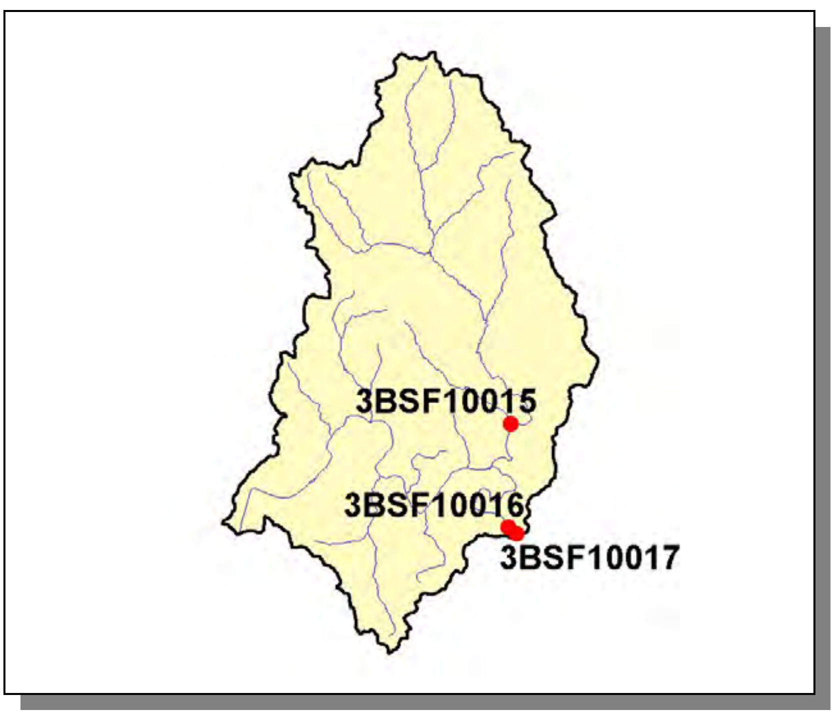


Figure 4-49. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301040106. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.A.vi.a. Point Source Contributions.

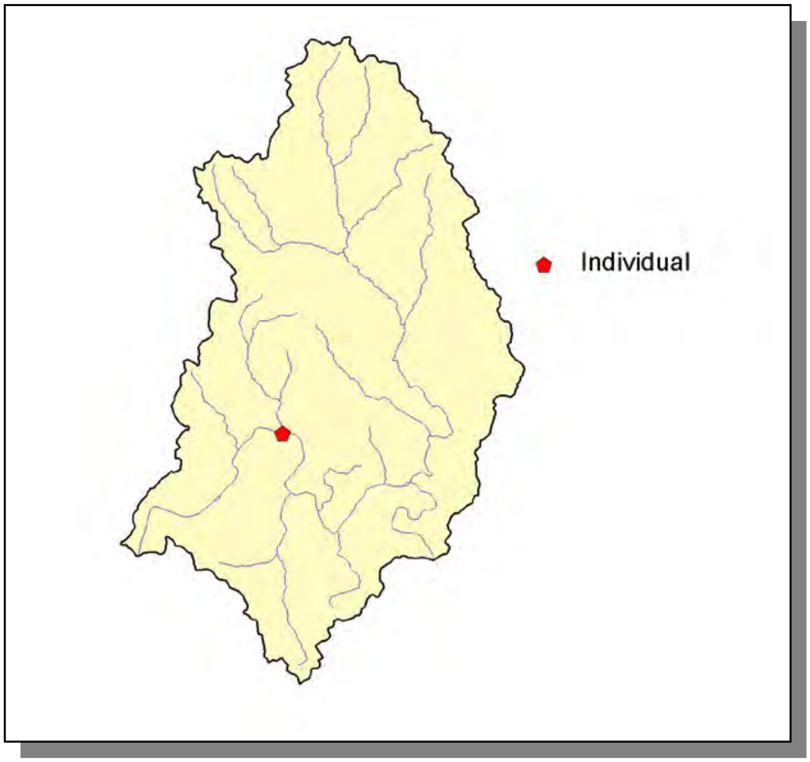


Figure 4-50. Location of Permits Issued in Subwatershed 051301040106. *More information, including the names of facilities, is provided in Appendix IV.*

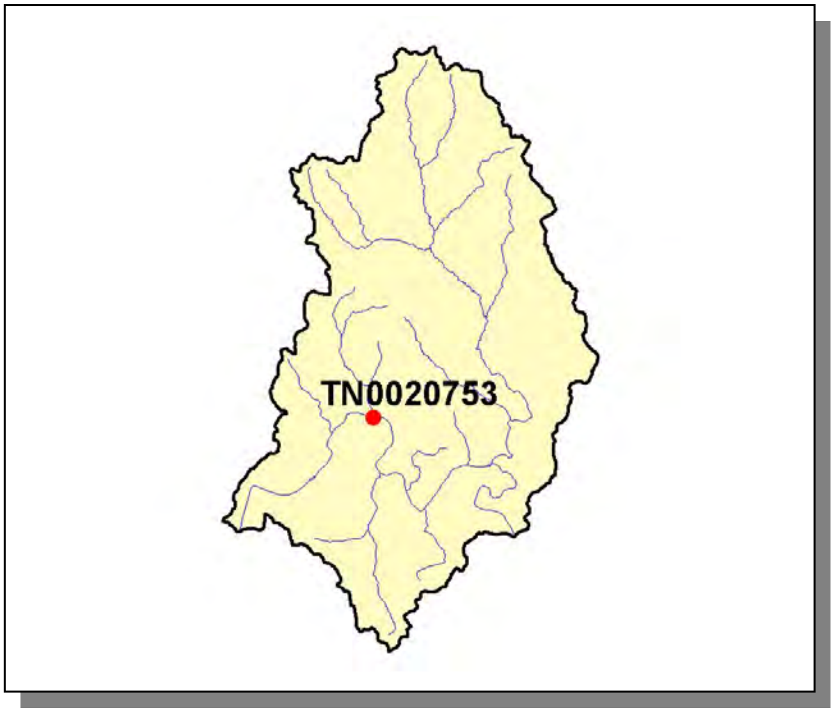


Figure 4-51. Location of Active NPDES Sites in Subwatershed 051301040106. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.A.vi.b. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
317	647	31	<5	289,541	<5	11

Table 4-36. Summary of Livestock Count Estimates in Subwatershed 051301040106. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Chickens (Layers)	Hogs	Sheep
Scott	2,177	4,447	216	1,989,506	196	17	74

Table 4-37. Summary of Livestock Count Estimates in Scott County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Scott	300.3	300.3	5.5	21.4

Table 4-38. Forest Acreage and Annual Removal Rates (1987-1994) in Scott County.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.33
Grass, Forbs, Legumes (Mixed Pasture)	0.58
Farmsteads and Ranch Headquarters	0.09

Table 4-39. Annual Estimated Total Soil Loss in Subwatershed 051301040106.

4.2.A.vii. 051301040107 (Brimstone Creek).

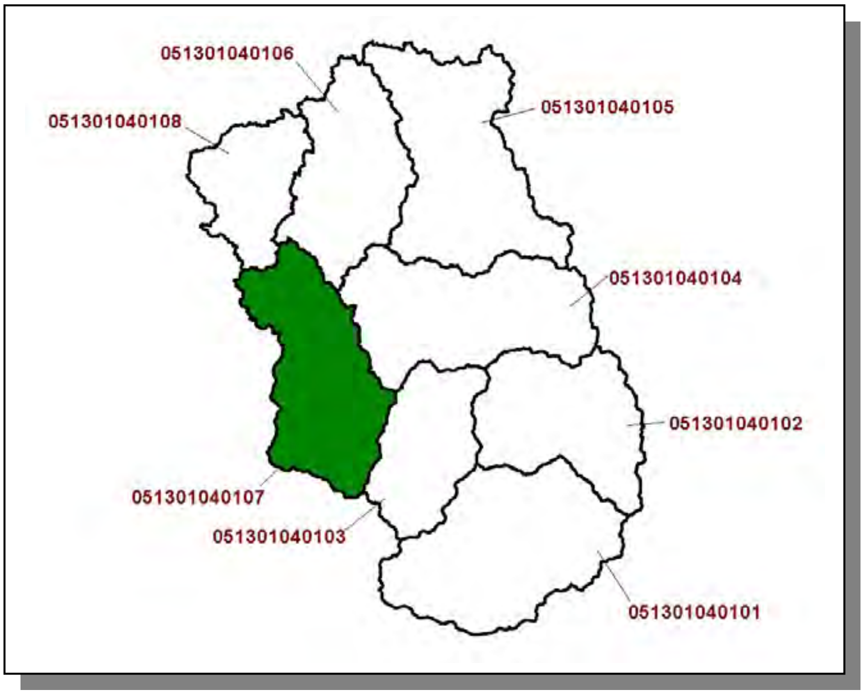


Figure 4-52. Location of Subwatershed 051301040107. *All HUC-12 subwatershed boundaries are shown for reference.*

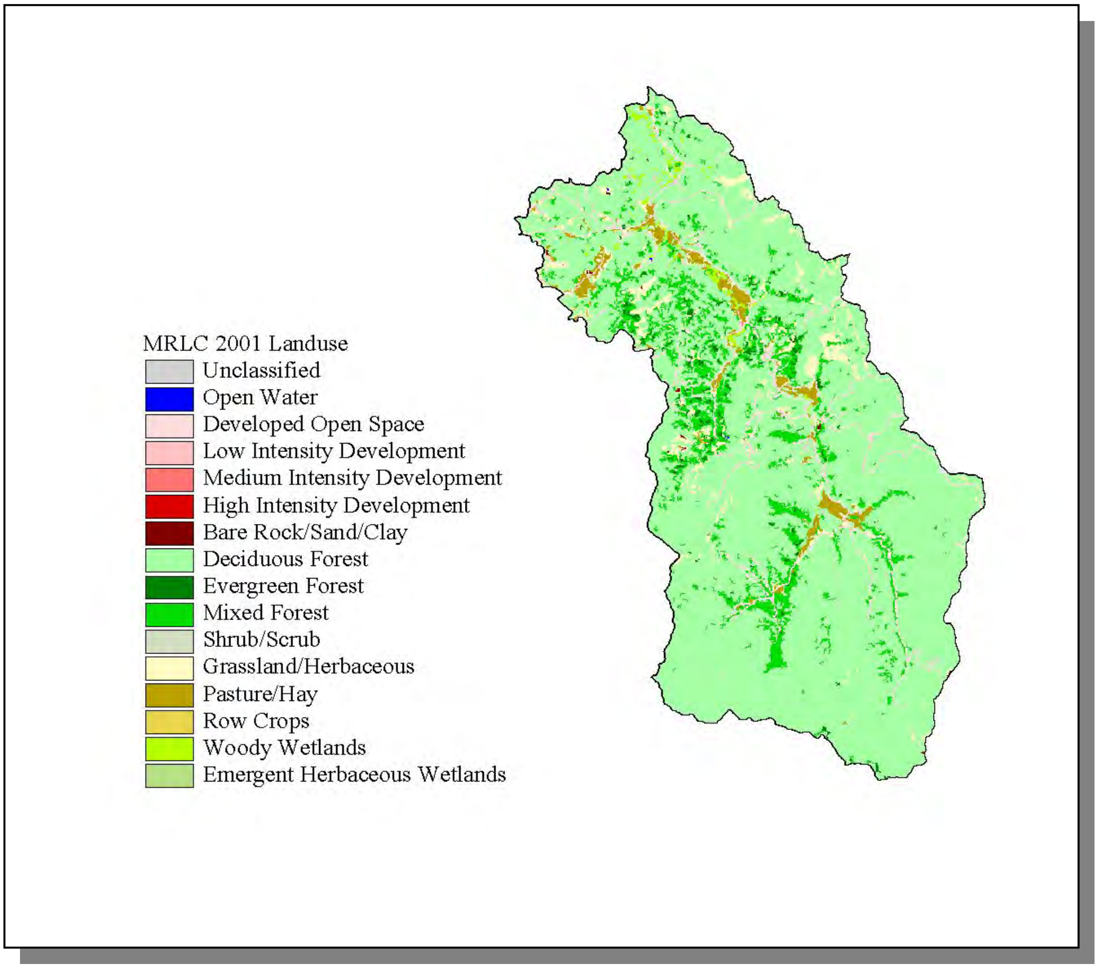


Figure 4-53. Illustration of Land Use Distribution in Subwatershed 051301040107.

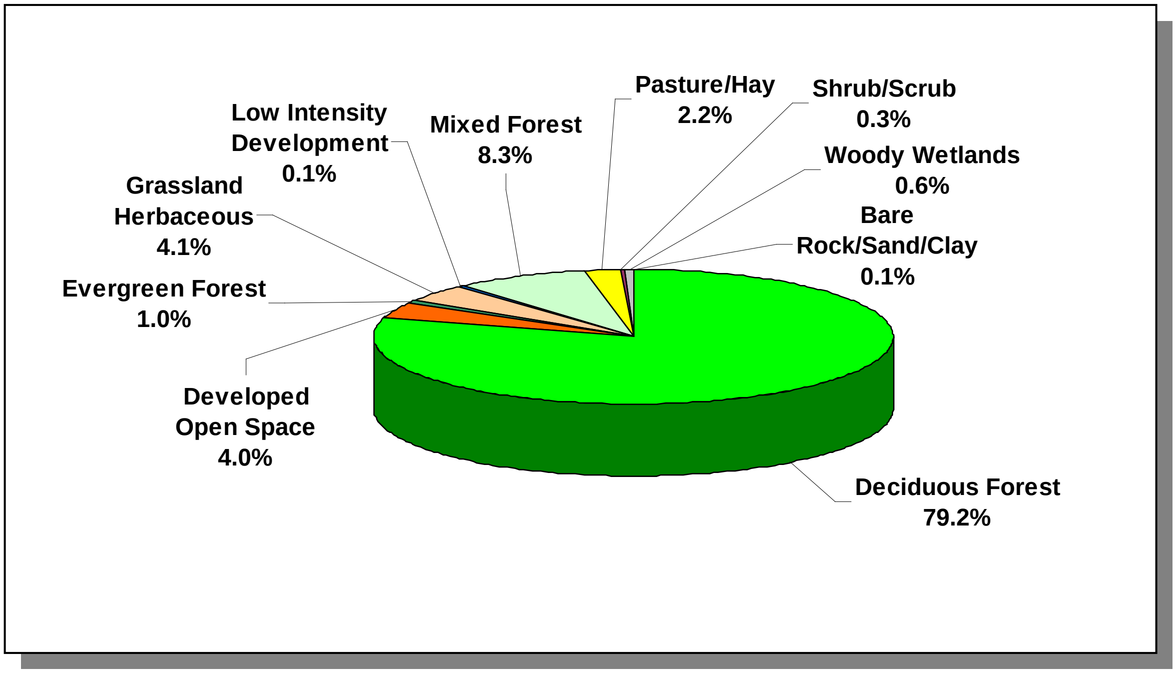


Figure 4-54. Land Use Distribution in Subwatershed 051301040107. *More information is provided in Appendix IV.*

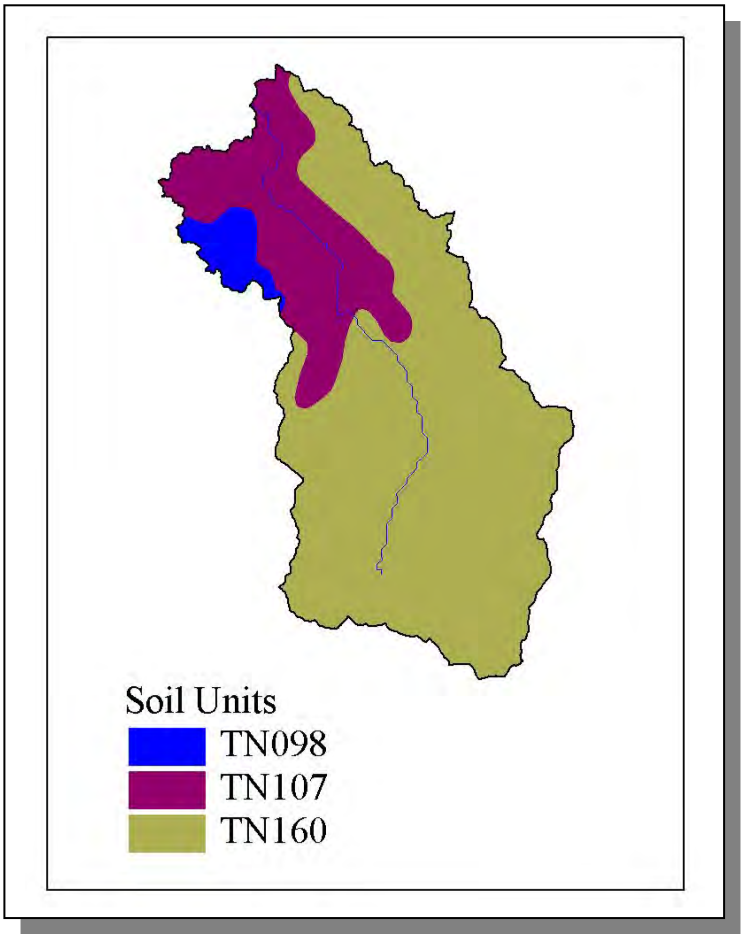


Figure 4-55. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040107.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN098	1.00	C	3.98	4.82	Loam	0.32
TN107	1.00	C	6.34	4.84	Loam	0.28
TN160	0.00	B	2.69	5.36	Loam	0.25

Table 4-40. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040107. *The definition of "Hydrologic Group" is provided in Appendix IV.*

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	COUNTY POPULATION				**ESTIMATED POPULATION IN WATERSHED**			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Morgan	17,300	18,521	19,757	1.16	201	215	229	13.9
Scott	18,358	19,816	21,127	8.62	1,583	1,708	1,821	15.0
Total	**35,658**	**38,337**	**40,884**		**1,784**	**1,923**	**2,050**	**14.9**

Table 4-41. Population Estimates in Subwatershed 051301040107.

Figure 4-56. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301040107. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.A.vii.a. Point Source Contributions.

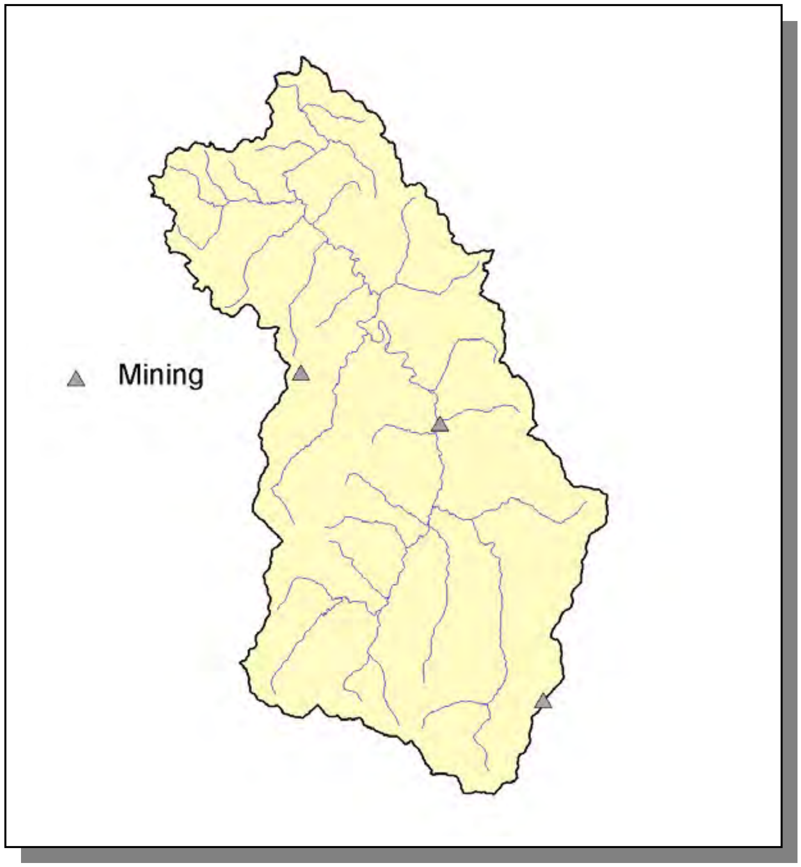

Figure 4-57. Location of Permits Issued in Subwatershed 051301040107. *More information, including the names of facilities, is provided in Appendix IV.*

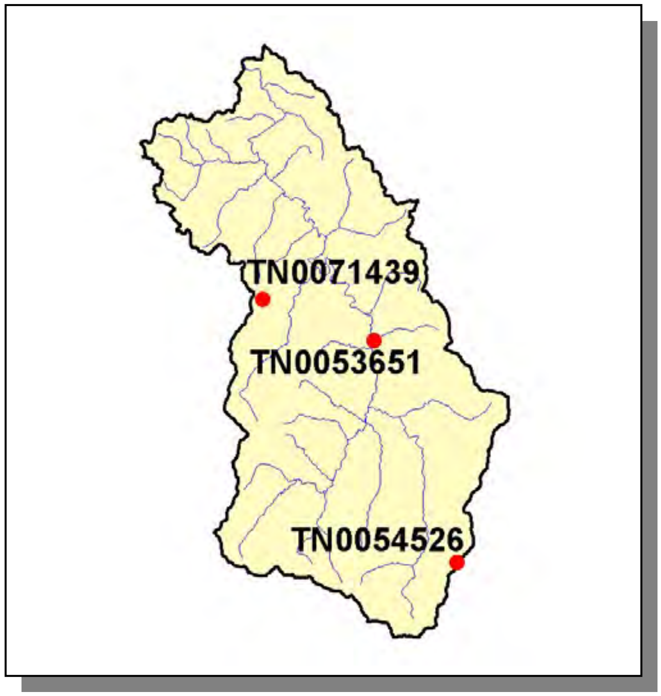

Figure 4-58. Location of Active Mining Sites in Subwatershed 051301040107. *More information, including the names of mining operations, is provided in Appendix IV.*

4.2.A.vii.b. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
139	283	13	<5	122,173	<5	5

Table 4-42. Summary of Livestock Count Estimates in Subwatershed 051301040107. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Chickens (Layers)	Hogs	Sheep
Morgan	4,697	8,853	251	1,501,559	194	83	35
Scott	2,177	4,447	216	1,989,506	196	17	74

Table 4-43. Summary of Livestock Count Estimates in Morgan and Scott Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Morgan	287.8	276.2	3.5	10.9
Scott	300.3	300.3	5.5	21.4

Table 4-44. Forest Acreage and Annual Removal Rates (1987-1994) in *Morgan and Scott Counties.*

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.34
Grass (Hayland)	0.77
Legumes, Grass (Hayland)	0.21
Grass, Forbs, Legumes (Mixed Pasture)	0.53
Corn (Row Crops)	7.18
Farmsteads and Ranch Headquarters	0.08

Table 4-45. Annual Estimated Total Soil Loss in Subwatershed 051301040107.

4.2.A.viii. 051301040108 (New River).

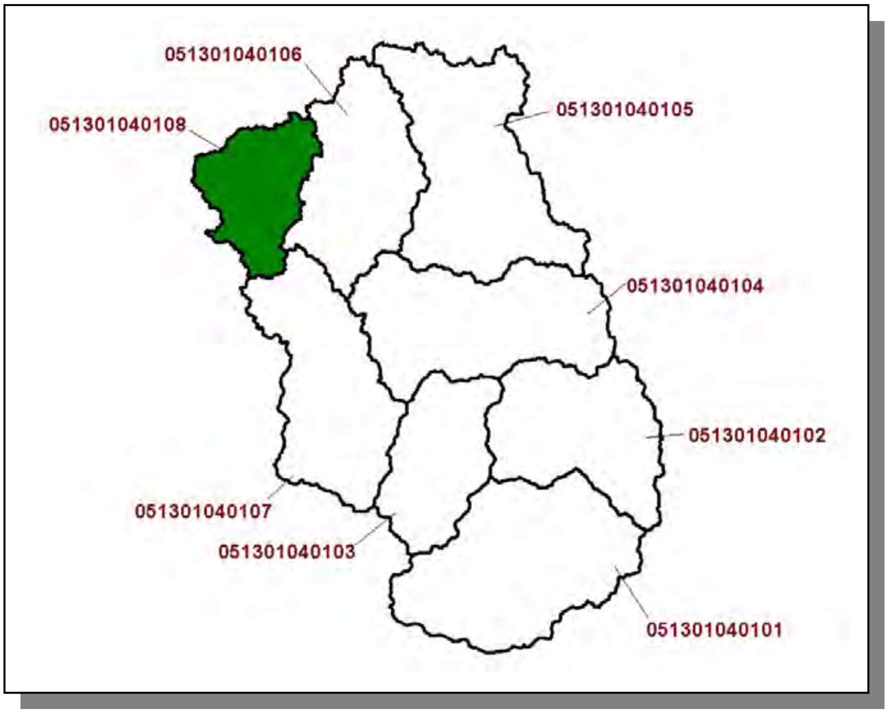

Figure 4-59. Location of Subwatershed 051301040108. *All HUC-12 subwatershed boundaries are shown for reference.*

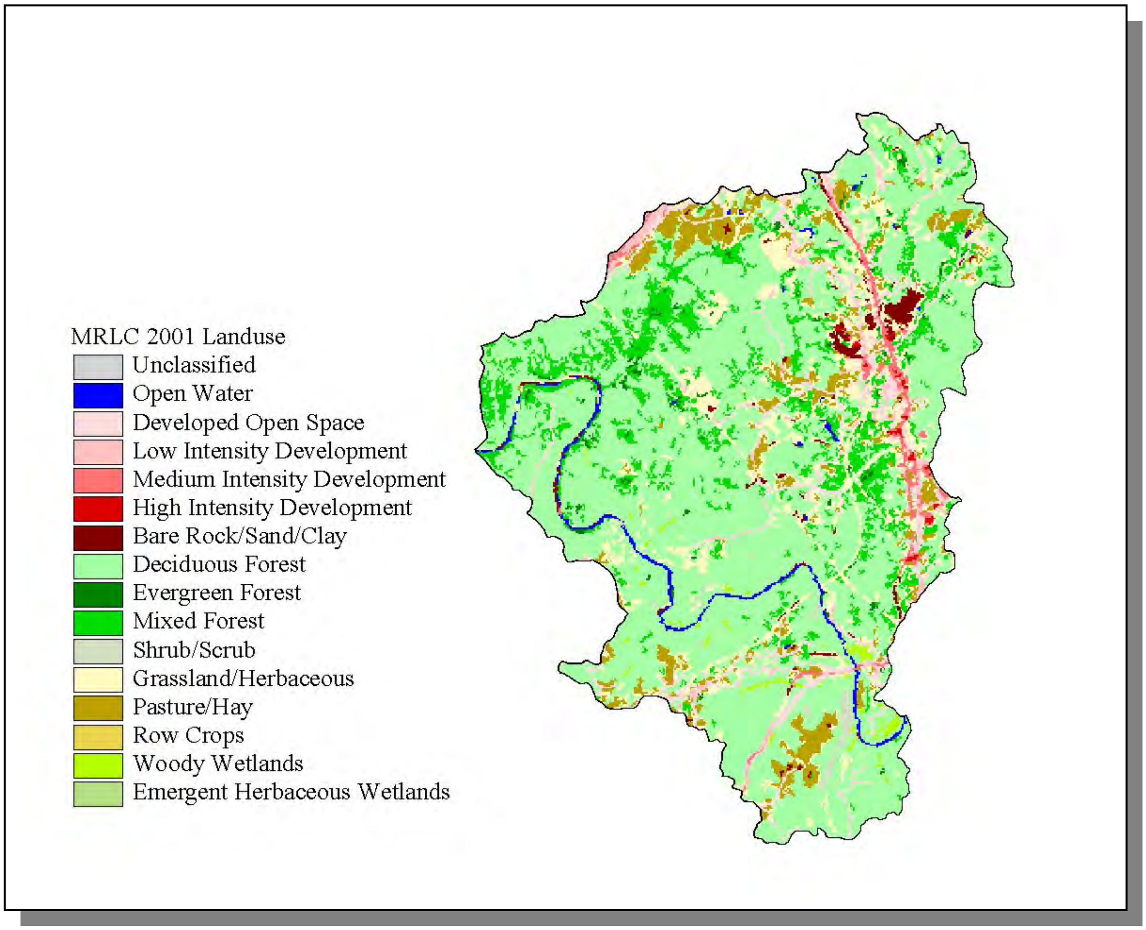

Figure 4-60. Illustration of Land Use Distribution in Subwatershed 051301040108.

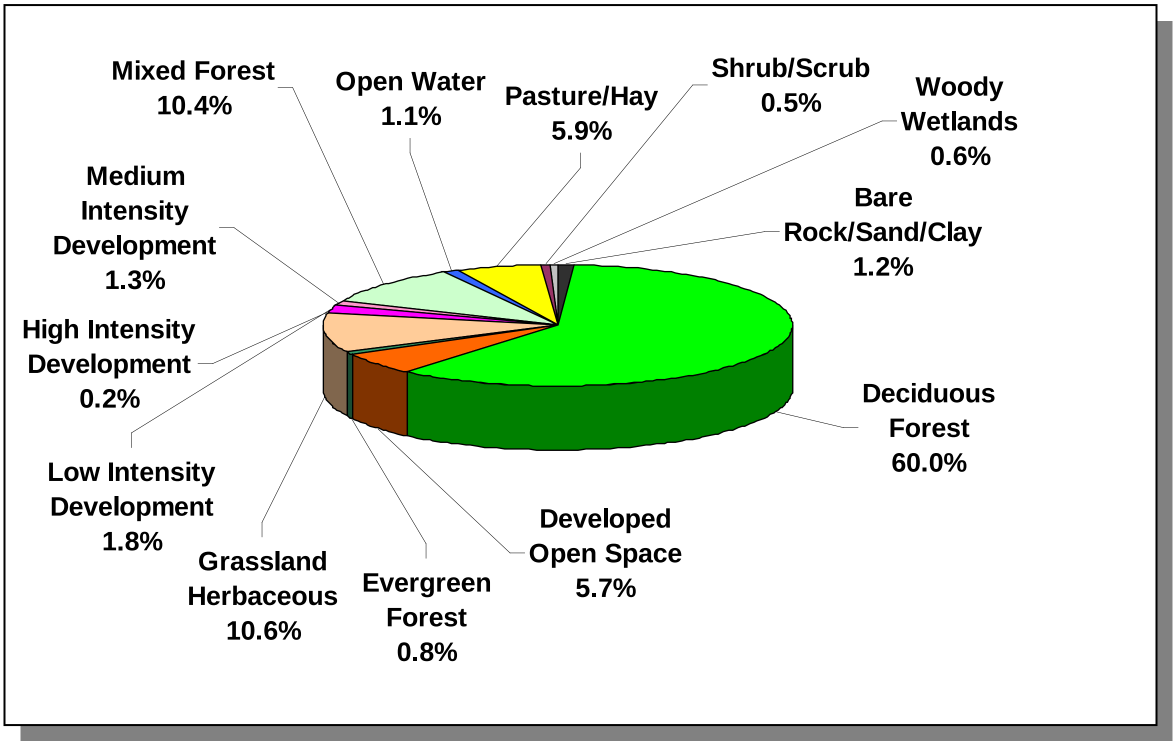

Figure 4-61. Land Use Distribution in Subwatershed 051301040108. *More information is provided in Appendix IV.*

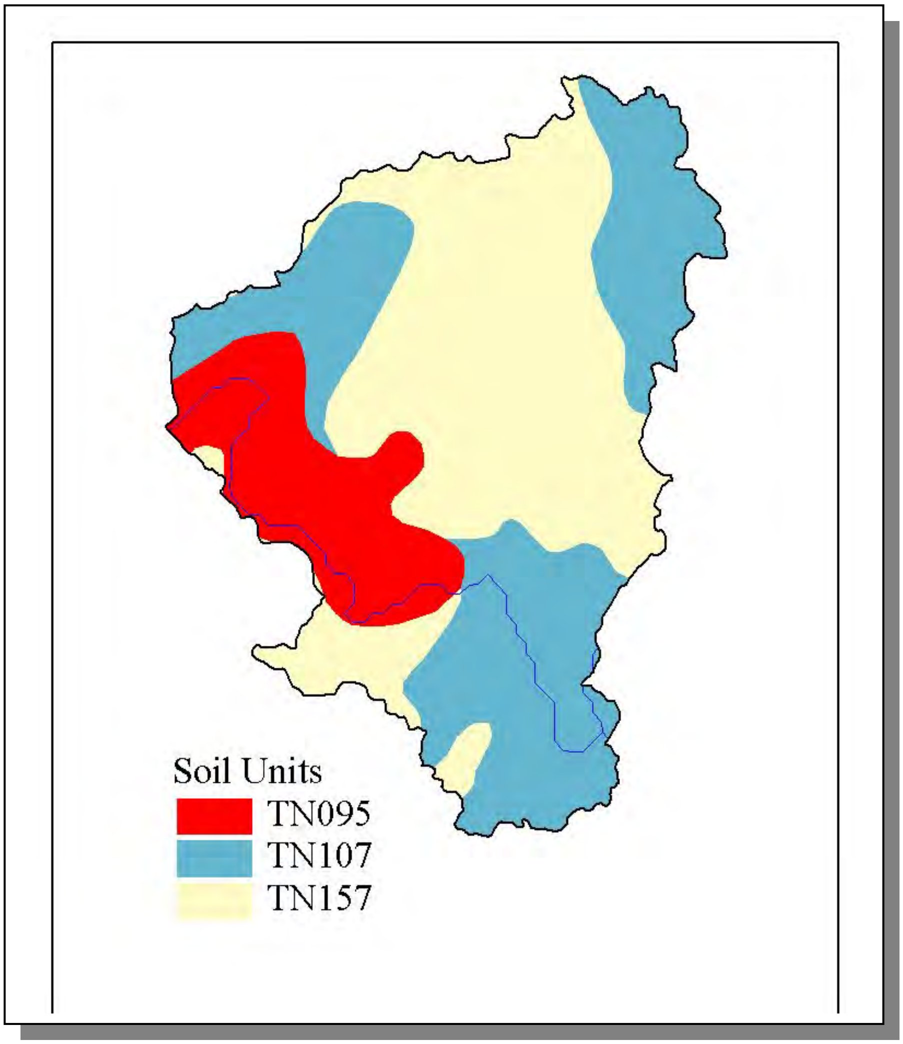

Figure 4-62. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040108.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN095	0.00	B	2.35	5.12	Loam	0.31
TN107	1.00	C	6.34	4.84	Loam	0.28
TN157	0.00	B	2.38	4.62	Loam	0.28

Table 4-46. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040108. *The definition of "Hydrologic Group" is provided in Appendix IV.*

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	COUNTY POPULATION				**ESTIMATED POPULATION IN WATERSHED**			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Scott	18,358	19,816	21,127	5.19	954	1,029	1,097	15.0

Table 4-47. Population Estimates in Subwatershed 051301040108.

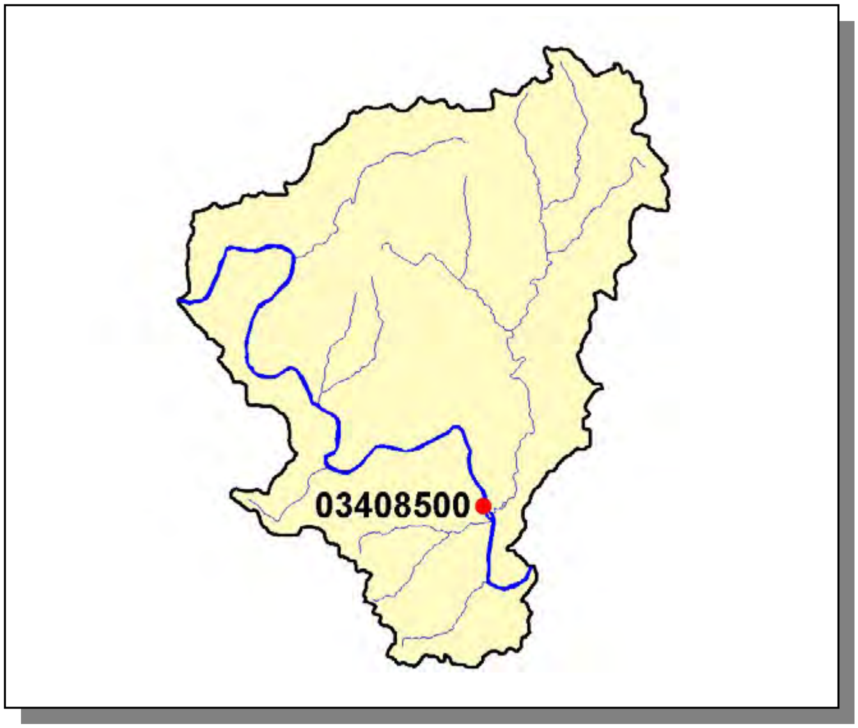

Figure 4-63. Location of Historical Streamflow Data Collection Sites in Subwatershed 051301040108. *More information is provided in Appendix IV.*

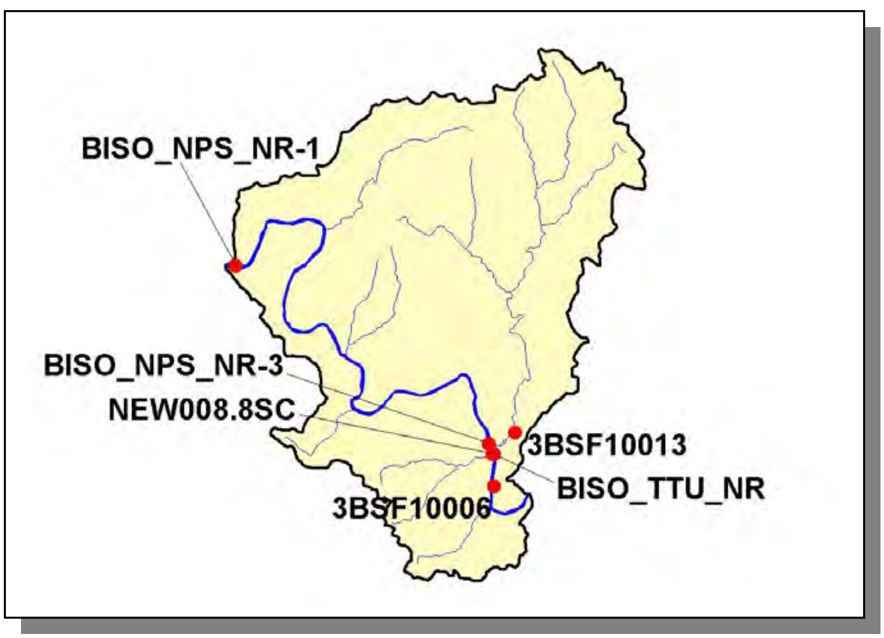

Figure 4-64. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301040108. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.A.viii.a. Point Source Contributions.

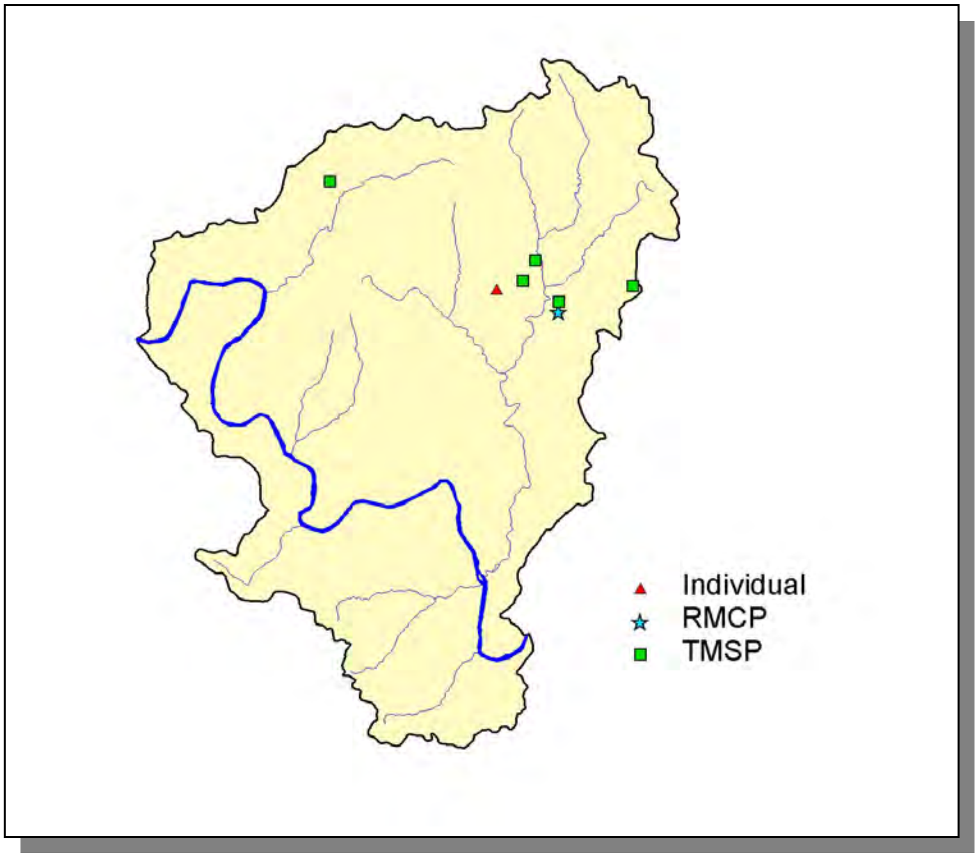

Figure 4-65. Location of Permits Issued in Subwatershed 051301040108. *More information, including the names of facilities, is provided in Appendix IV.*

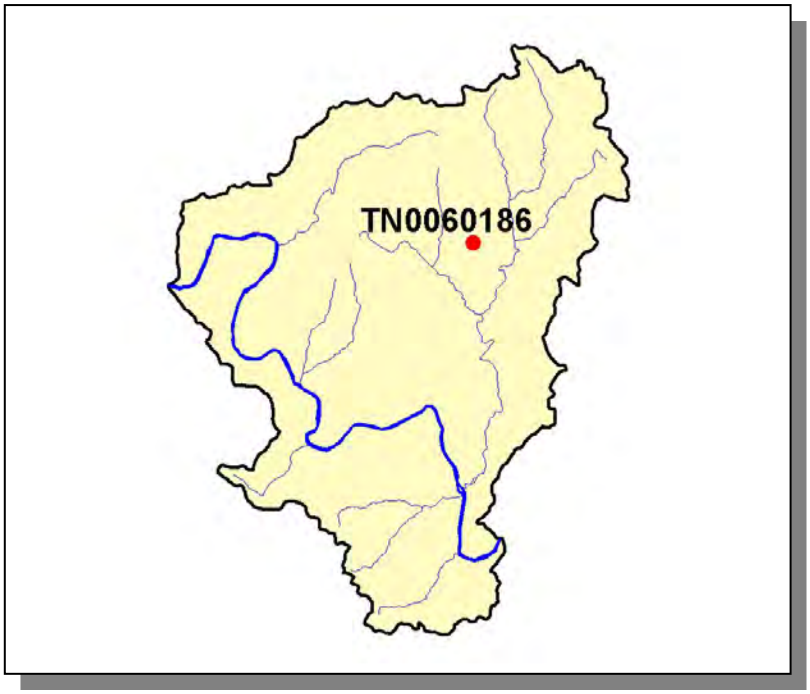

Figure 4-66. Location of Active NPDES Sites in Subwatershed 051301040108. *More information, including the names of facilities, is provided in Appendix IV.*

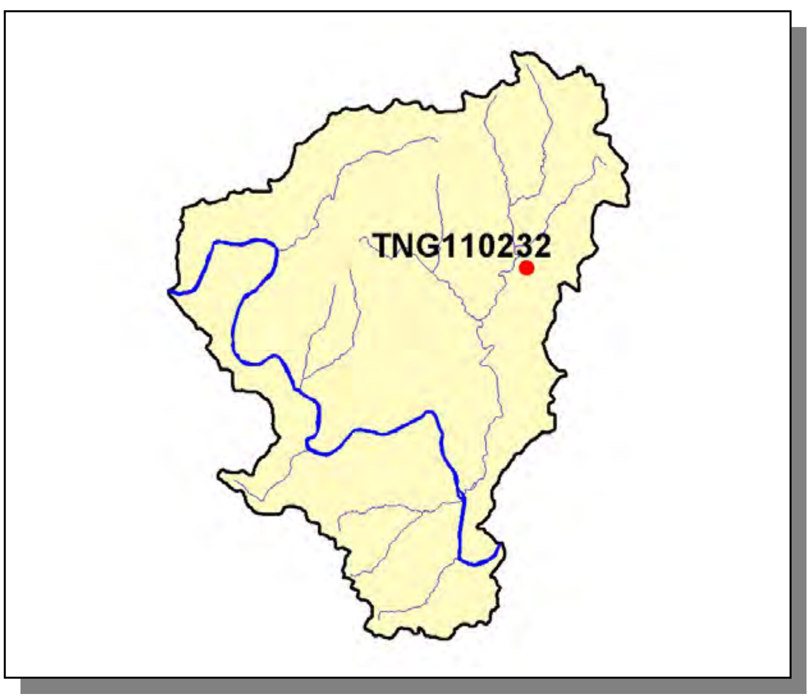

Figure 4-67. Location of Ready Mix Concrete Plants (RMCP) in Subwatershed 051301040108. *More information is provided in Appendix IV.*

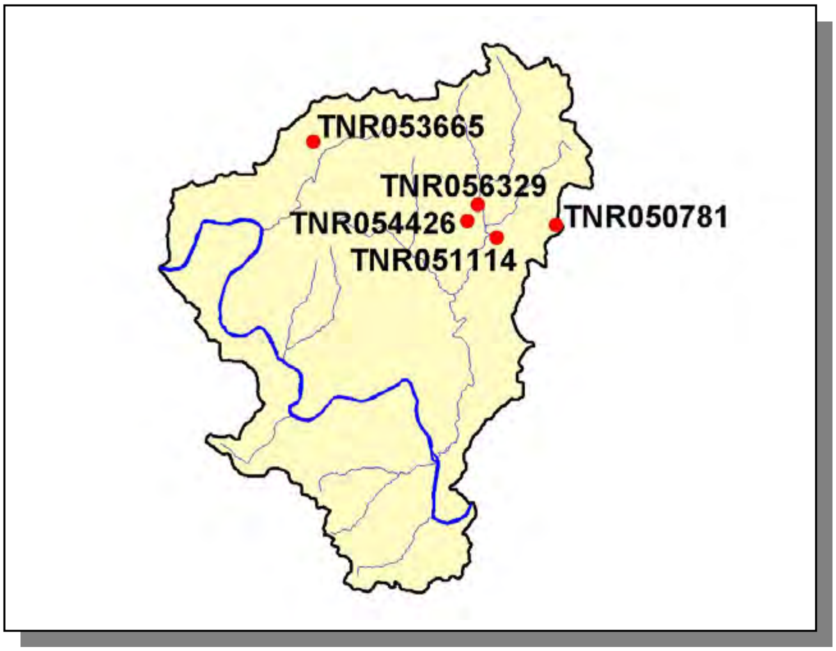

Figure 4-68. Location of TMSP Sites in Subwatershed 051301040108. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.A.viii.b. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
184	376	18	<5	168,112	<5	6

Table 4-48. Summary of Livestock Count Estimates in Subwatershed 051301040108. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Chickens (Layers)	Hogs	Sheep
Scott	2,177	4,447	216	1,989,506	196	17	74

Table 4-49. Summary of Livestock Count Estimates in Scott County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Scott	300.3	300.3	5.5	21.4

Table 4-50. Forest Acreage and Annual Removal Rates (1987-1994) in Scott County.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.33
Grass, Forbs, Legumes (Mixed Pasture)	0.58
Farmsteads and Ranch Headquarters	0.09

Table 4-51. Annual Estimated Total Soil Loss in Subwatershed 051301040108.

4.2.B. 0513010402.

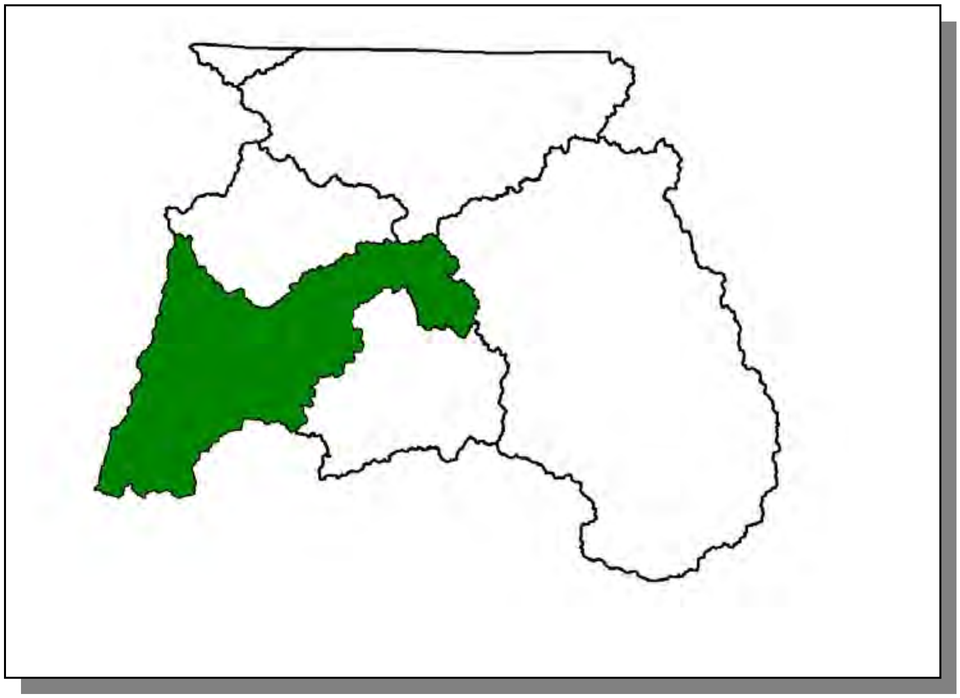

Figure 4-69. Location of Subwatershed 0513010402. *All South Fork Cumberland River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.2.B.i. 051301040201 (North Prong Clear Fork).

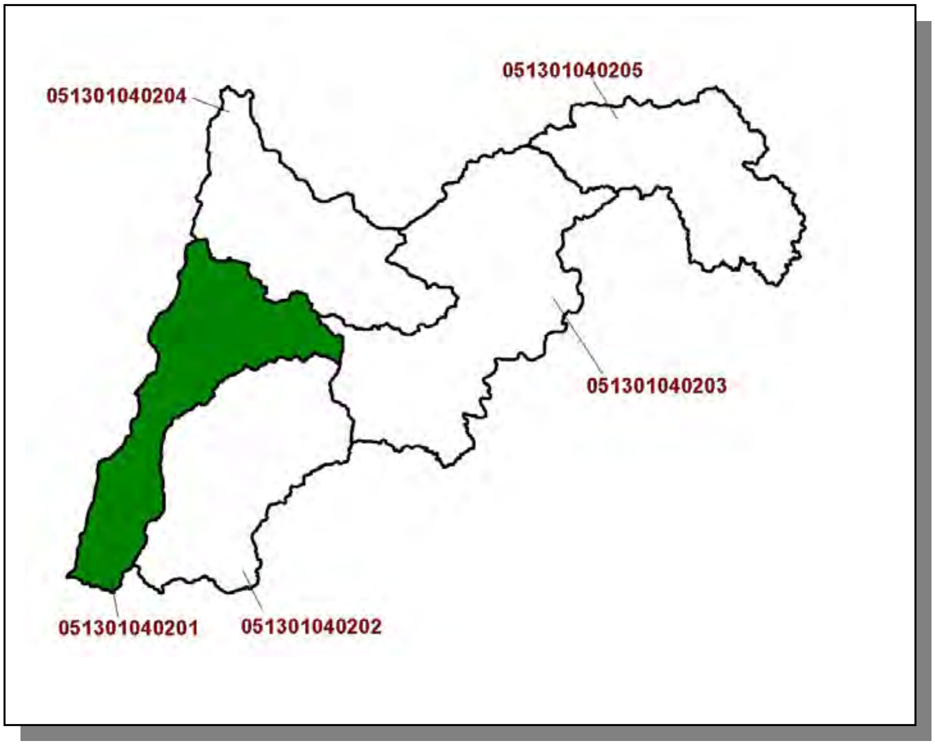

Figure 4-70. Location of Subwatershed 051301040201. *All HUC-12 subwatershed boundaries are shown for reference.*

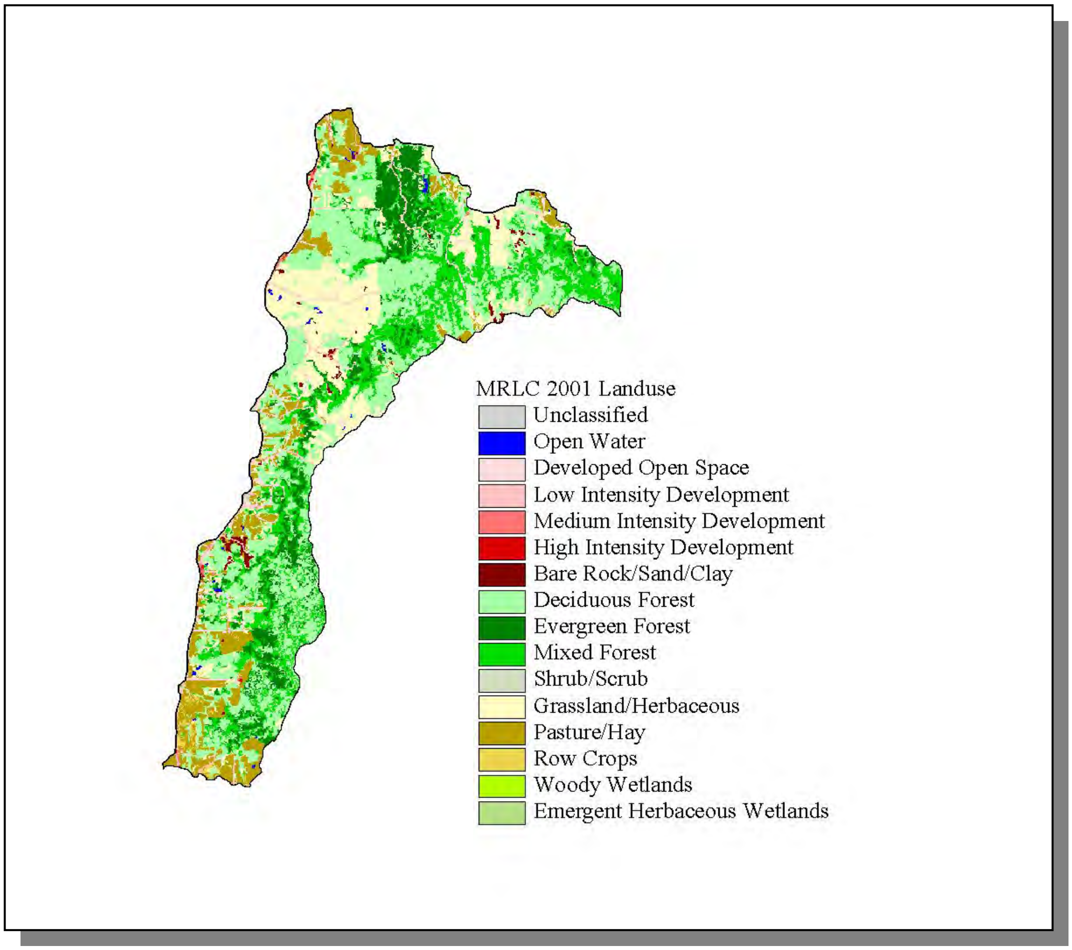

Figure 4-71. Illustration of Land Use Distribution in Subwatershed 051301040201.

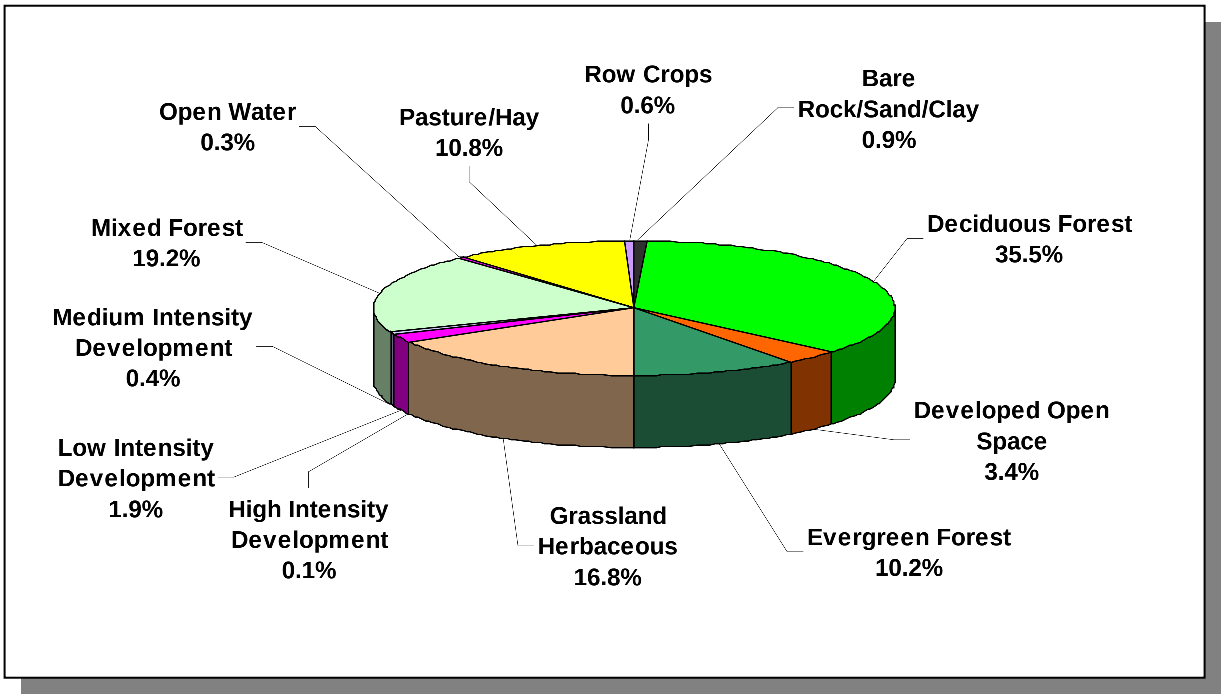

Figure 4-72. Land Use Distribution in Subwatershed 051301040201. *More information is provided in Appendix IV.*

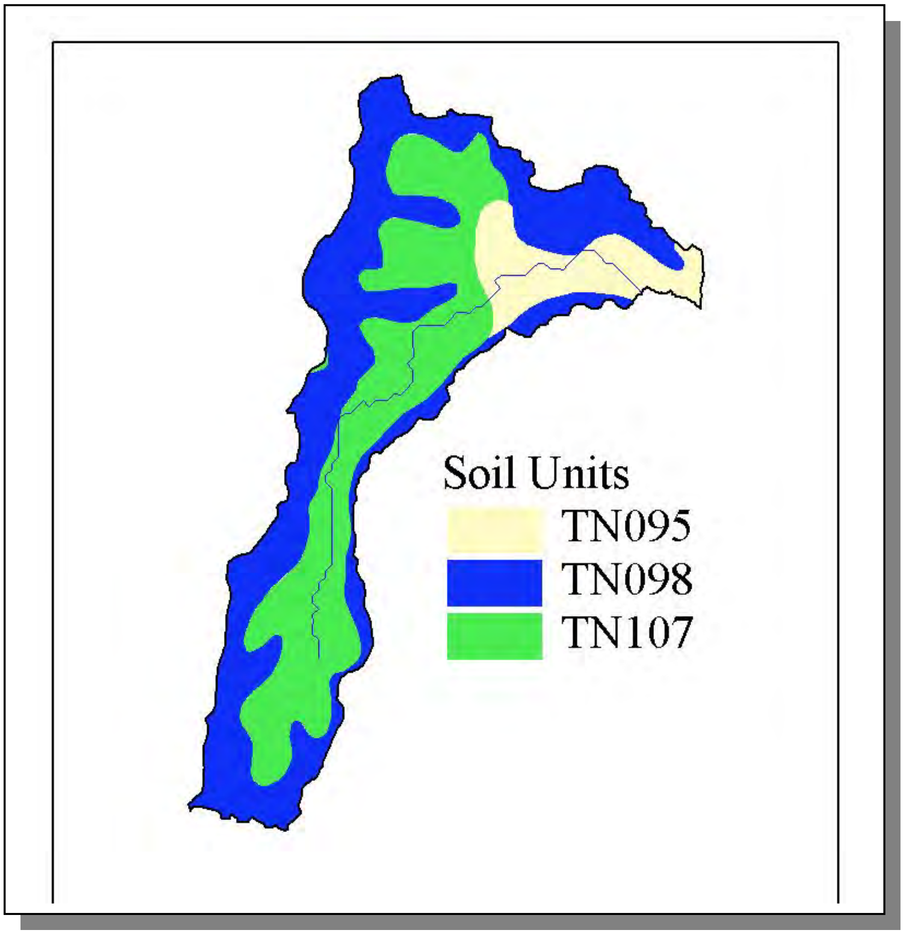

Figure 4-73. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040201.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN095	0.00	B	2.35	5.12	Loam	0.31
TN098	1.00	C	3.98	4.82	Loam	0.32
TN107	1.00	C	6.34	4.84	Loam	0.28

Table 4-52. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040201. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Fentress	14,669	15,920	16,625	6.47	948	1,029	1,075	13.4

Table 4-53. Population Estimates in Subwatershed 051301040201.

4.2.B.i.a. Point Source Contributions.

Figure 4-74. Location of Permits Issued in Subwatershed 051301040201. *More information, including the names of facilities, is provided in Appendix IV.*

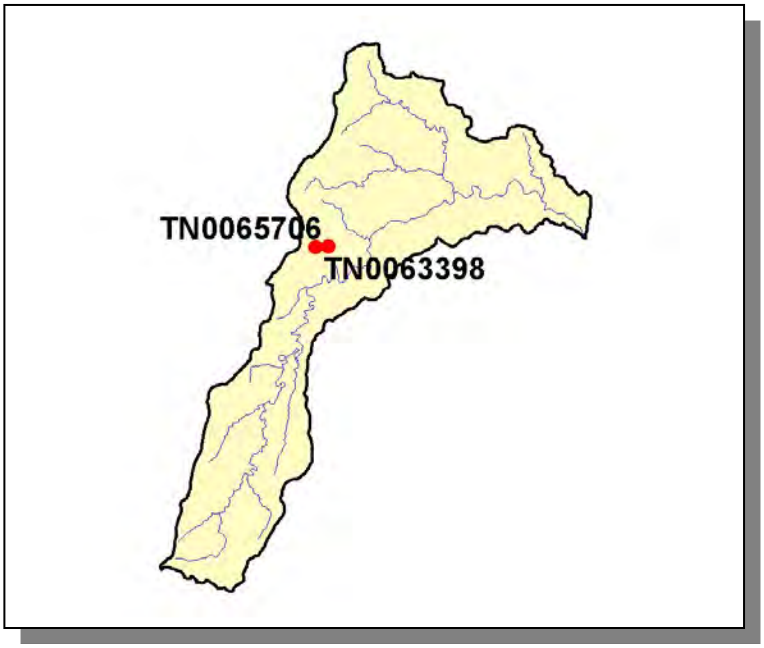

Figure 4-75. Location of Active Mining Sites in Subwatershed 051301040201. *More information, including the names of mining operations, is provided in Appendix IV.*

4.2.B.i.b. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
792	1,696	42	<5	716,228	72	8

Table 4-54. Summary of Livestock Count Estimates in Subwatershed 051301040201. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Chickens (Layers)	Hogs	Sheep
Fentress	8,058	17,259	430	7,290,026	474	729	79

Table 4-55. Summary of Livestock Count Estimates in Fentress County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Fentress	244.1	244.1	3.6	14.3

Table 4-56. Forest Acreage and Annual Removal Rates (1987-1994) in Fentress County.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.72
Legumes, Grass (Hayland)	0.56
Grass, Forbs, Legumes (Mixed Pasture)	0.27
Corn (Row Crops)	16.18
Soybeans (Row Crops)	6.00
Wheat (Close-Grown Cropland)	43.4
Other Vegetable and Truck Crops	15.94
Farmsteads and Ranch Headquarters	0.4

Table 4-57. Annual Estimated Total Soil Loss in Subwatershed 051301040201.

4.2.B.ii. 051301040202 (South Prong Clear Fork).

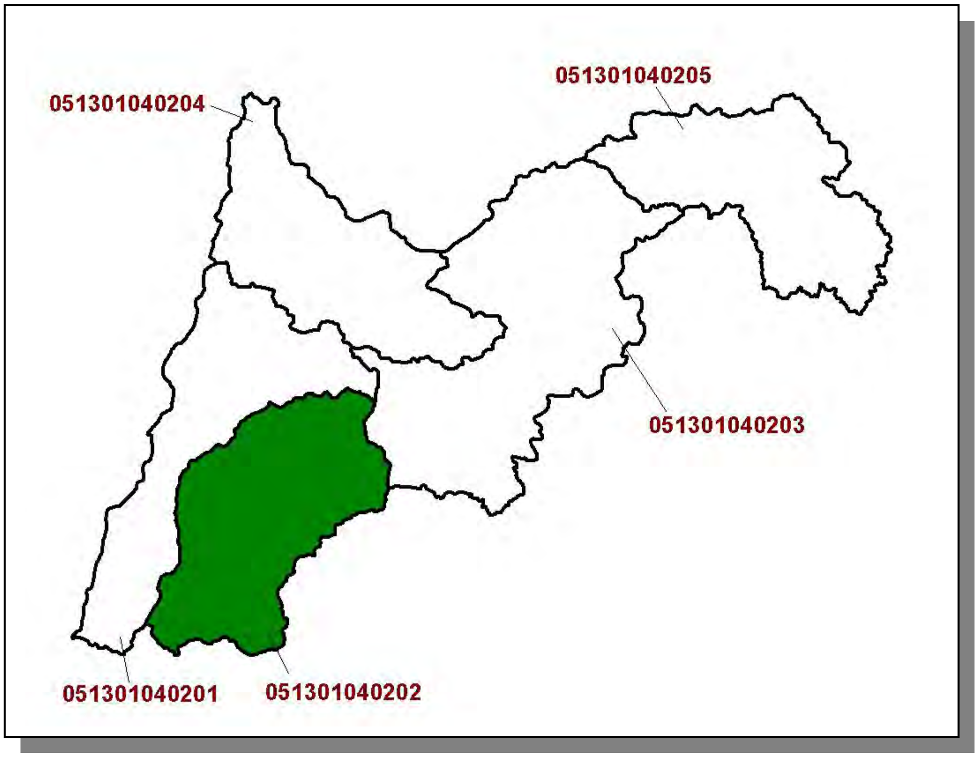

Figure 4-76. Location of Subwatershed 051301040202. *All HUC-12 subwatershed boundaries are shown for reference.*

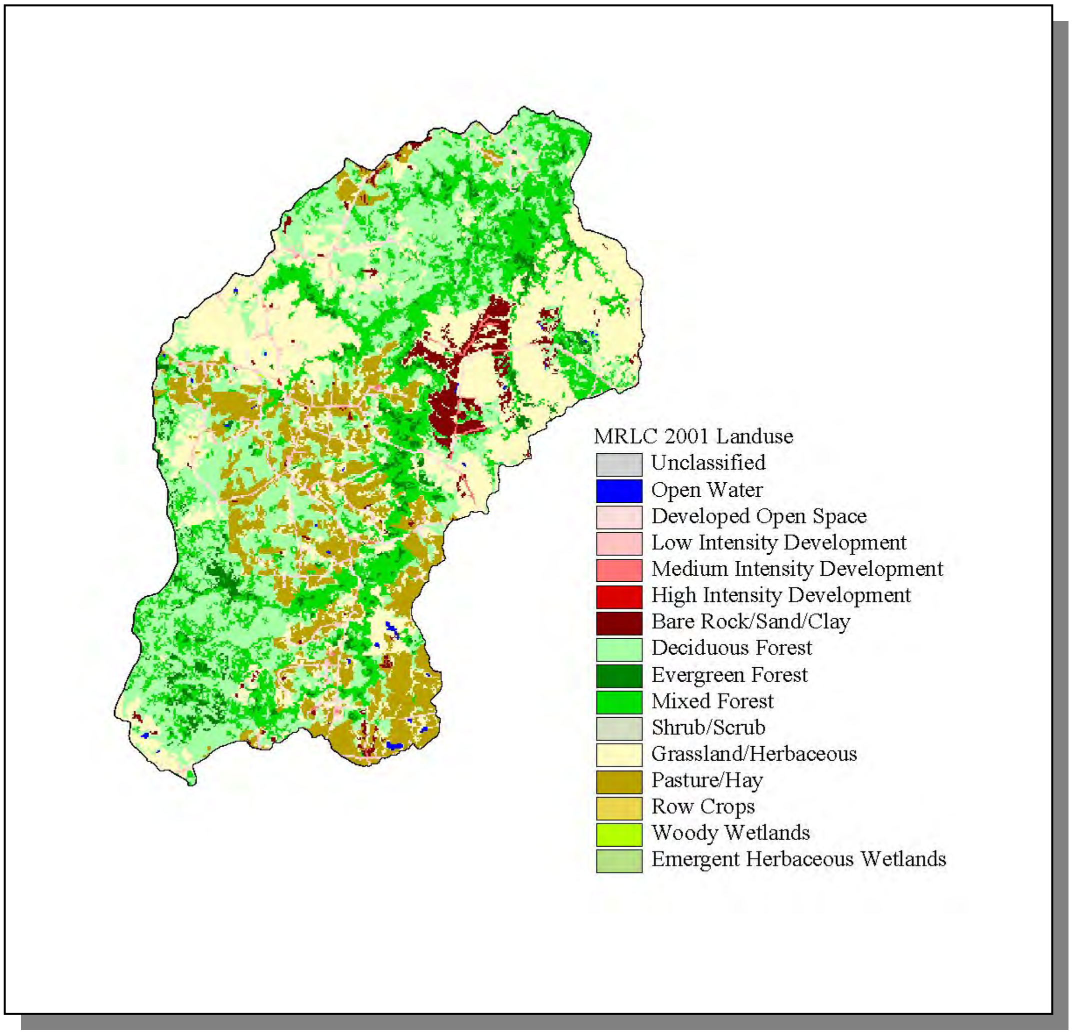

Figure 4-77. Illustration of Land Use Distribution in Subwatershed 051301040202.

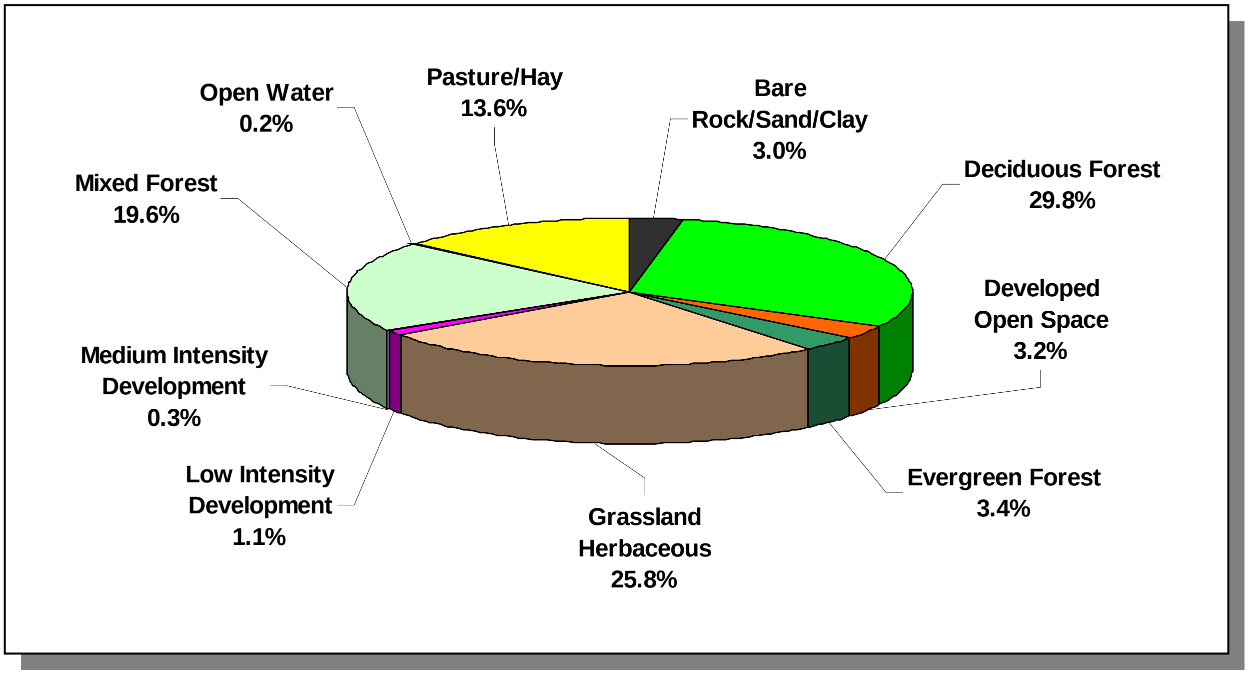

Figure 4-78. Land Use Distribution in Subwatershed 051301040202. *More information is provided in Appendix IV.*

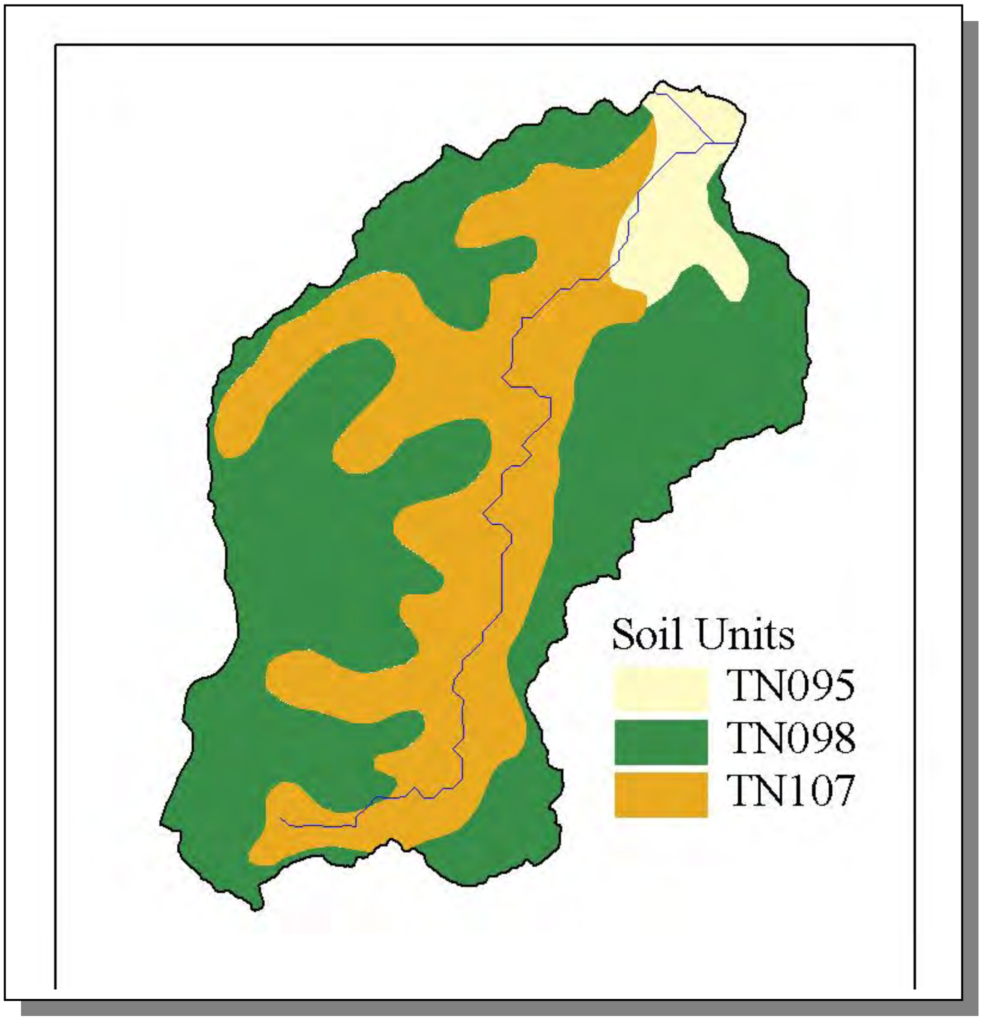

Figure 4-79. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040202.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN095	0.00	B	2.35	5.12	Loam	0.31
TN098	1.00	C	3.98	4.82	Loam	0.32
TN107	1.00	C	6.34	4.84	Loam	0.28

Table 4-58. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040202. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Fentress	14,669	15,920	16,625	6.52	957	1,038	1,084	13.3
Morgan	17,300	18,521	19,757	0.51	89	95	102	14.6
Total	**31,969**	**34,441**	**36,382**		**1,046**	**1,133**	**1,186**	**13.4**

Table 4-59. Population Estimates in Subwatershed 051301040202.

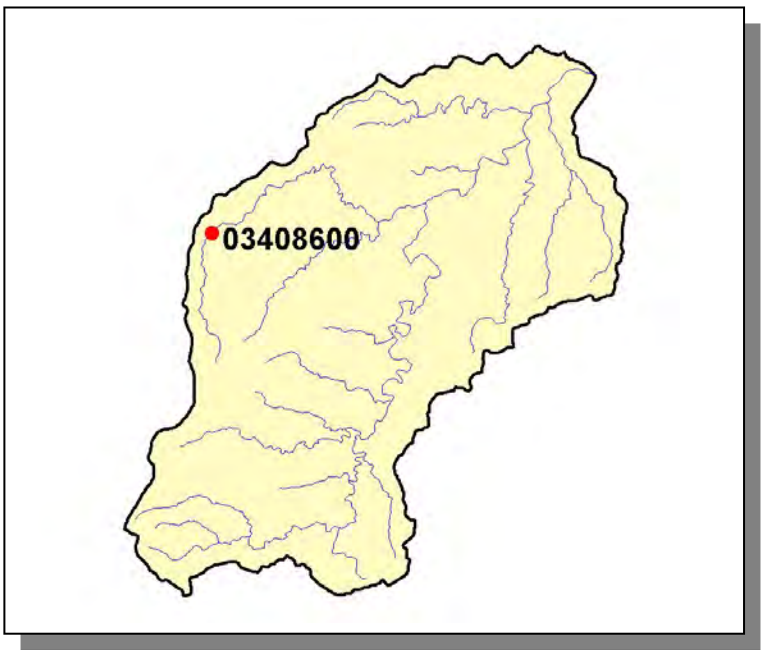

Figure 4-80. Location of Historical Streamflow Data Collection Sites in Subwatershed 051301040202. *More information is provided in Appendix IV.*

4.2.B.ii.a. Point Source Contributions.

Figure 4-81. Location of Permits Issued in Subwatershed 051301040202. *More information, including the names of facilities, is provided in Appendix IV.*

Figure 4-82. Location of Active Mining Sites in Subwatershed 051301040202. *More information, including the names of mining operations, is provided in Appendix IV.*

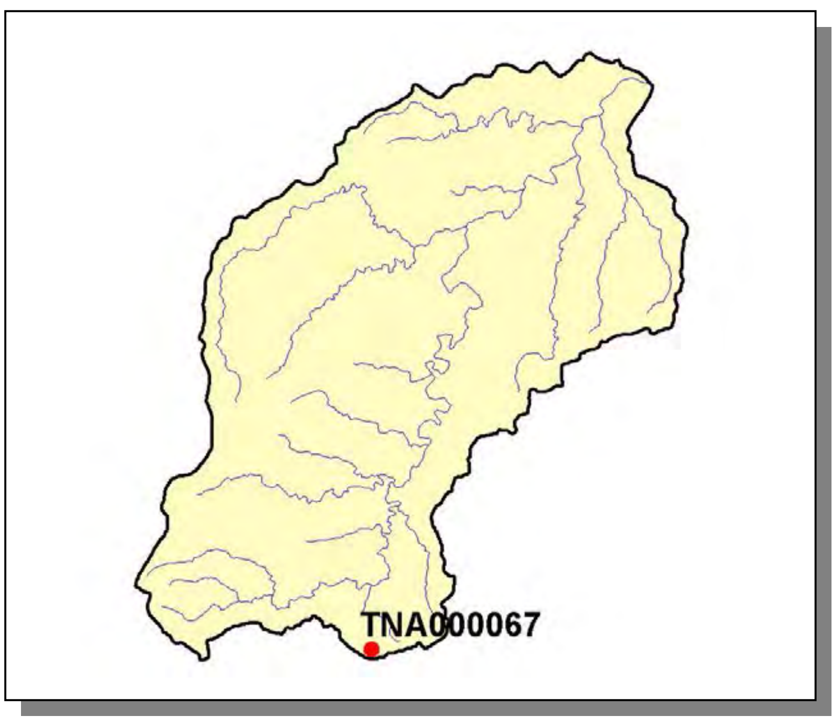

Figure 4-83. Location of Concentrated Animal Feeding Operations (CAFO) in Subwatershed 051301040202. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.B.ii.b. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
818	1,753	44	<5	740,319	74	8

Table 4-60. Summary of Livestock Count Estimates in Subwatershed 051301040202. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Chickens (Layers)	Hogs	Sheep
Fentress	8,058	17,259	430	7,290,026	474	729	79
Morgan	4,697	8,853	251	1,501,559	194	83	35

Table 4-61. Summary of Livestock Count Estimates in Fentress and Morgan Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Fentress	244.1	244.1	3.6	14.3
Morgan	287.8	276.2	3.5	10.9

Table 4-62. Forest Acreage and Annual Removal Rates (1987-1994) in Fentress and Morgan Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.70
Grass (Hayland)	0.77
Legumes, Grass (Hayland)	0.53
Grass, Forbs, Legumes (Mixed Pasture)	0.26
Corn (Row Crops)	15.49
Soybeans (Row Crops)	6.00
Wheat (Close-Grown Cropland)	43.40
Other Vegetable and Truck Crop	15.94
Farmsteads and Ranch Headquarters	0.37

Table 4-63. Annual Estimated Total Soil Loss in Subwatershed 051301040202.

4.2.B.iii. 051301040203 (Upper Clear Fork).

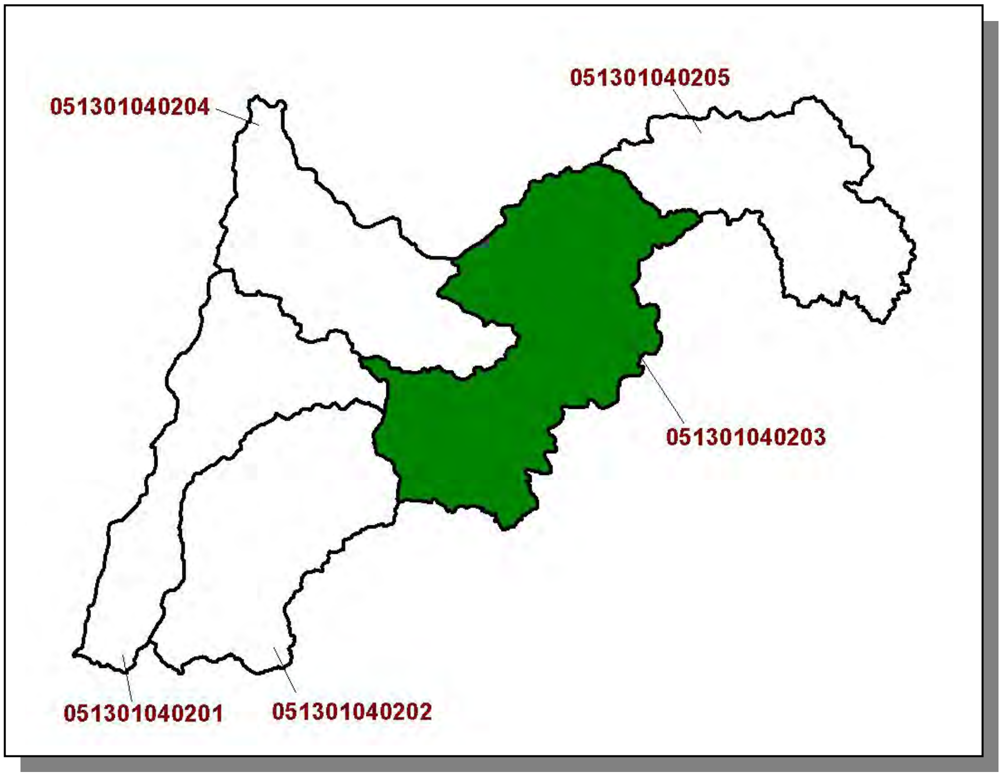

Figure 4-84. Location of Subwatershed 051301040203. *All HUC-12 subwatershed boundaries are shown for reference.*

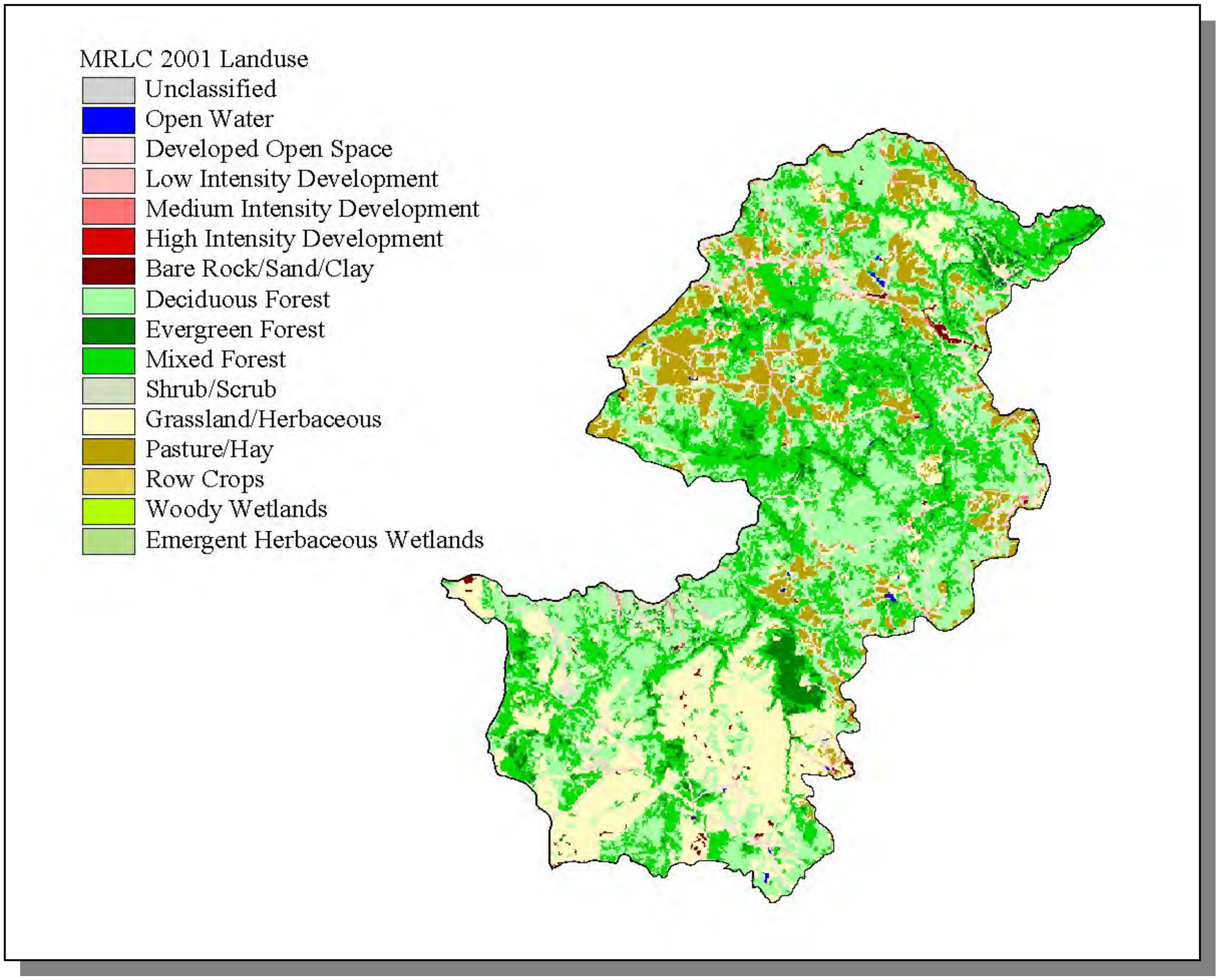

Figure 4-85. Illustration of Land Use Distribution in Subwatershed 051301040203.

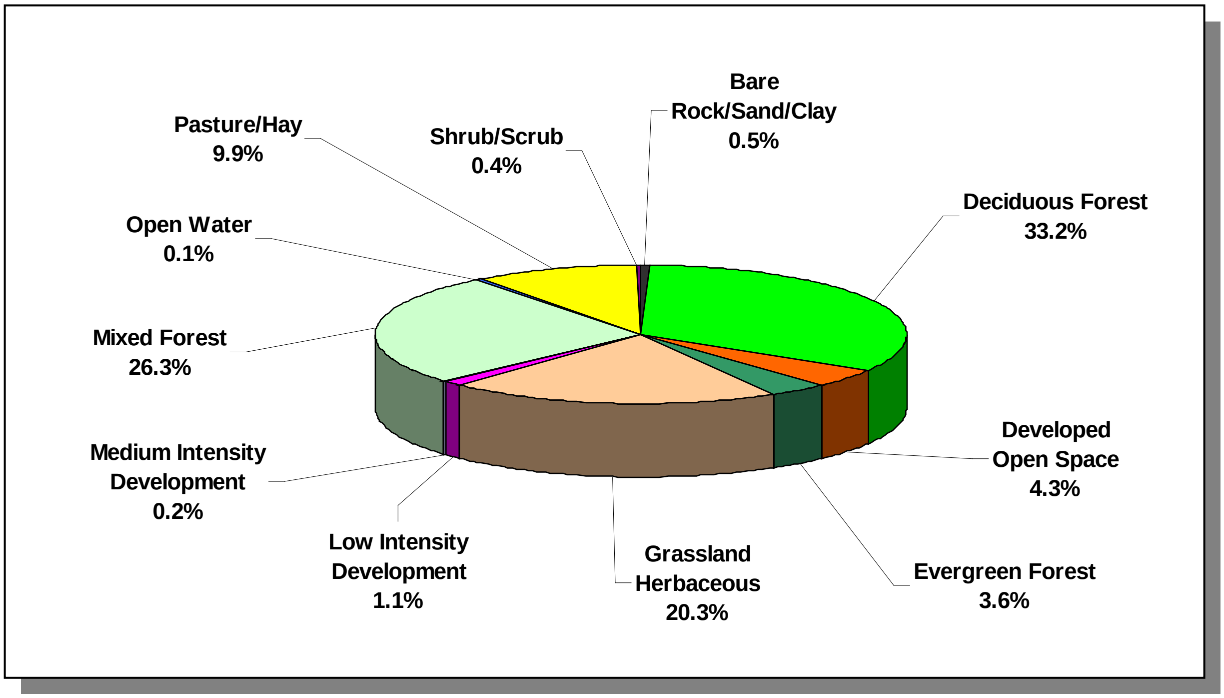

Figure 4-86. Land Use Distribution in Subwatershed 051301040203. *More information is provided in Appendix IV.*

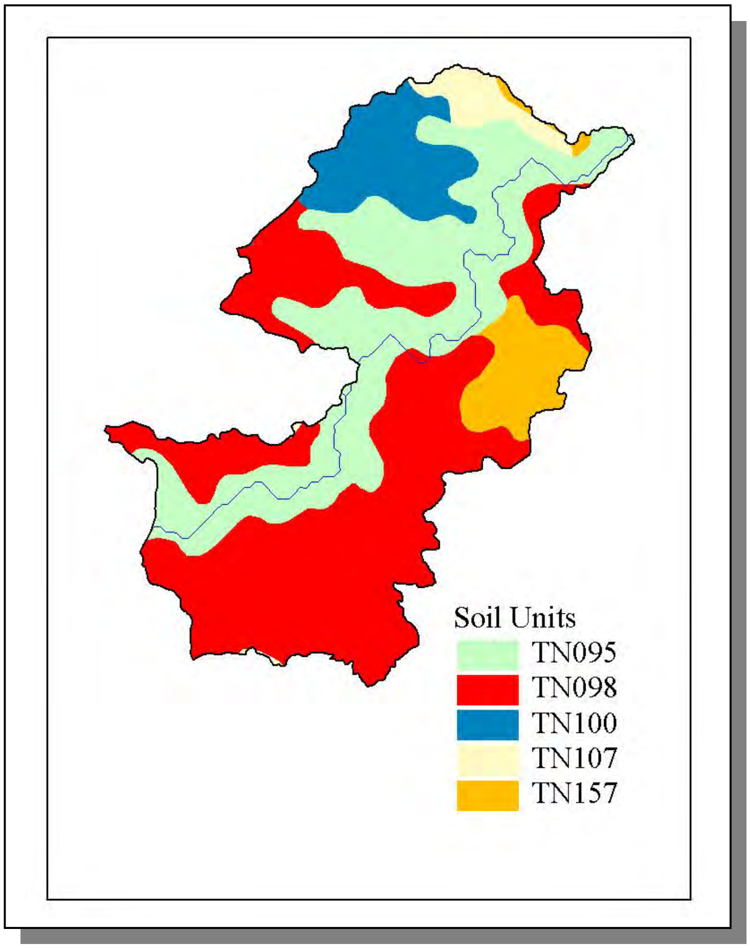

Figure 4-87. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040203.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN095	0.00	B	2.35	5.12	Loam	0.31
TN098	1.00	C	3.98	4.82	Loam	0.32
TN100	0.00	B	1.14	3.35	Silty Loam	0.21
TN107	1.00	C	6.34	4.84	Loam	0.28
TN157	0.00	B	2.38	4.62	Loam	0.28

Table 4-64. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040203. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Fentress	14,669	15,920	16,625	5.27	774	840	877	13.3
Morgan	17,300	18,521	19,757	4.82	834	893	953	14.3
Scott	18,358	19,816	21,127	0.01	2	2	2	0.0
Total	**50,327**	**54,257**	**57,509**		**1,610**	**1,735**	**1,832**	**13.8**

Table 4-65. Population Estimates in Subwatershed 051301040203.

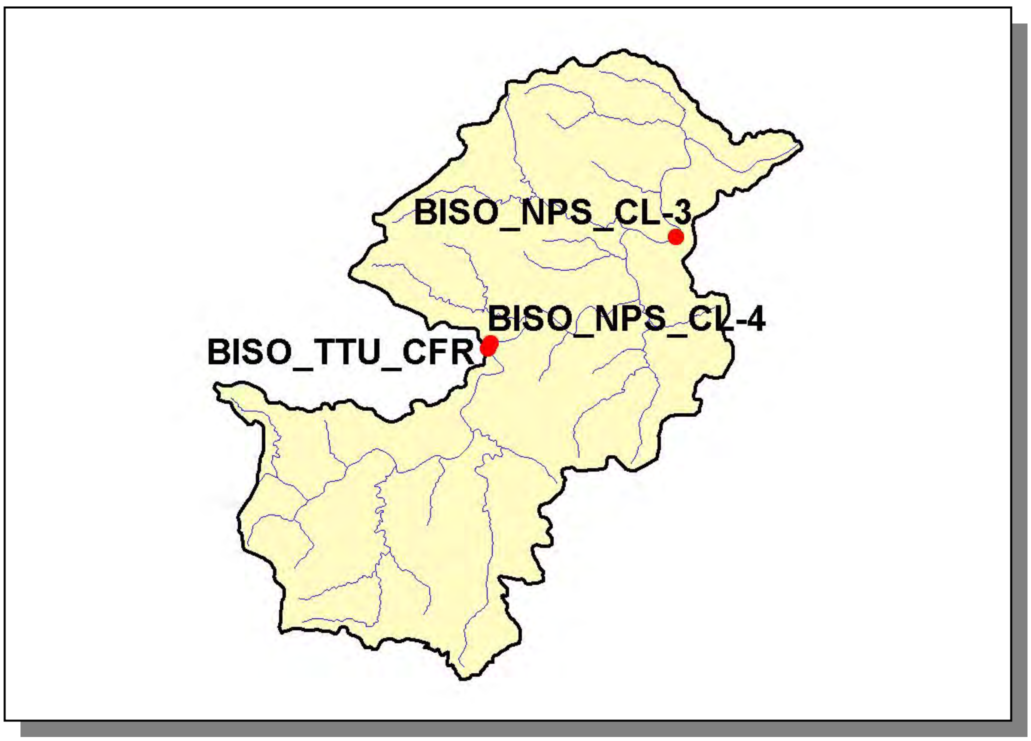

Figure 4-88. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301040203. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.B.iii.a. Point Source Contributions.

Figure 4-89. Location of Permits Issued in Subwatershed 0513010400203. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.B.iii.b. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
904	1,861	48	<5	648,297	61	8

Table 4-66. Summary of Livestock Count Estimates in Subwatershed 051301040203. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* **"***Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Chickens (Layers)	Hogs	Sheep
Fentress	8,058	17,259	430	7,290,026	474	729	79
Morgan	4,697	8,853	251	1,501,559	194	83	35
Scott	2,177	4,447	216	1,989,506	196	17	74

Table 4-67. Summary of Livestock Count Estimates in Fentress, Morgan, and Scott Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* **"***Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Fentress	244.1	244.1	3.6	14.3
Morgan	287.8	276.2	3.5	10.9
Scott	300.3	300.3	5.5	21.4

Table 4-68. Forest Acreage and Annual Removal Rates (1987-1994) in Fentress, Morgan, and Scott Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.58
Grass (Hayland)	0.77
Legumes, Grass (Hayland)	0.39
Grass, Forbs, Legumes (Mixed Pasture)	0.19
Corn (Row Crops)	11.78
Soybeans (Row Crops)	6.00
Wheat (Close-Grown Cropland)	43.40
Other Vegetable and Truck Crops	15.94
Farmsteads and Ranch Headquarters	0.22

Table 4-69. Annual Estimated Total Soil Loss in Subwatershed 051301040203.

4.2.B.iv. 051301040204 (Crooked Creek).

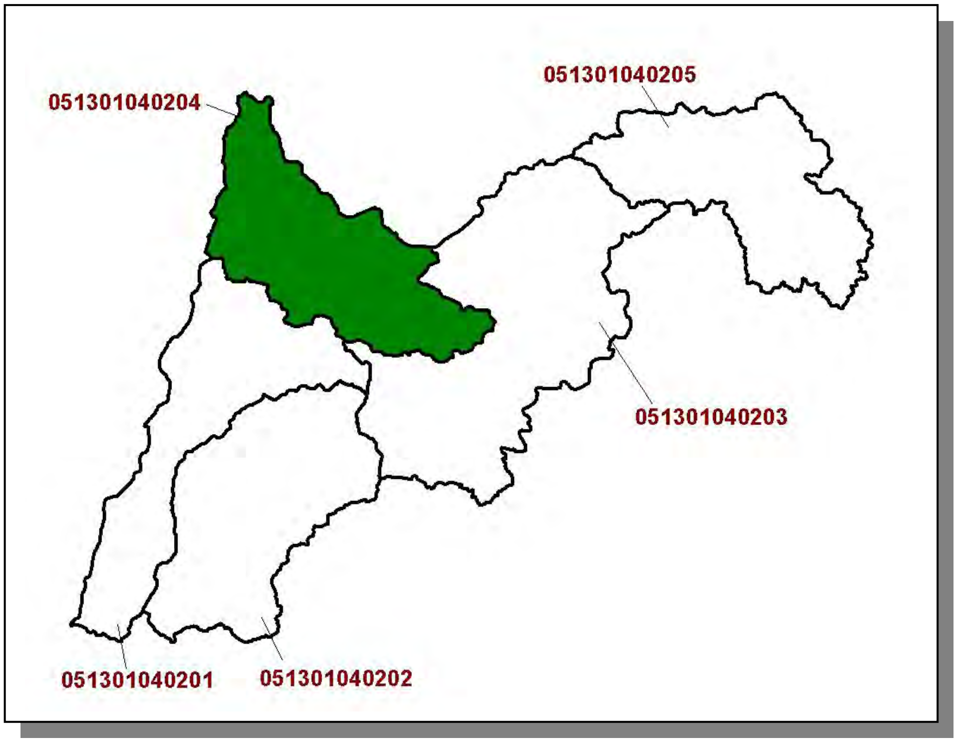

Figure 4-90. Location of Subwatershed 051301040204. *All HUC-12 subwatershed boundaries are shown for reference.*

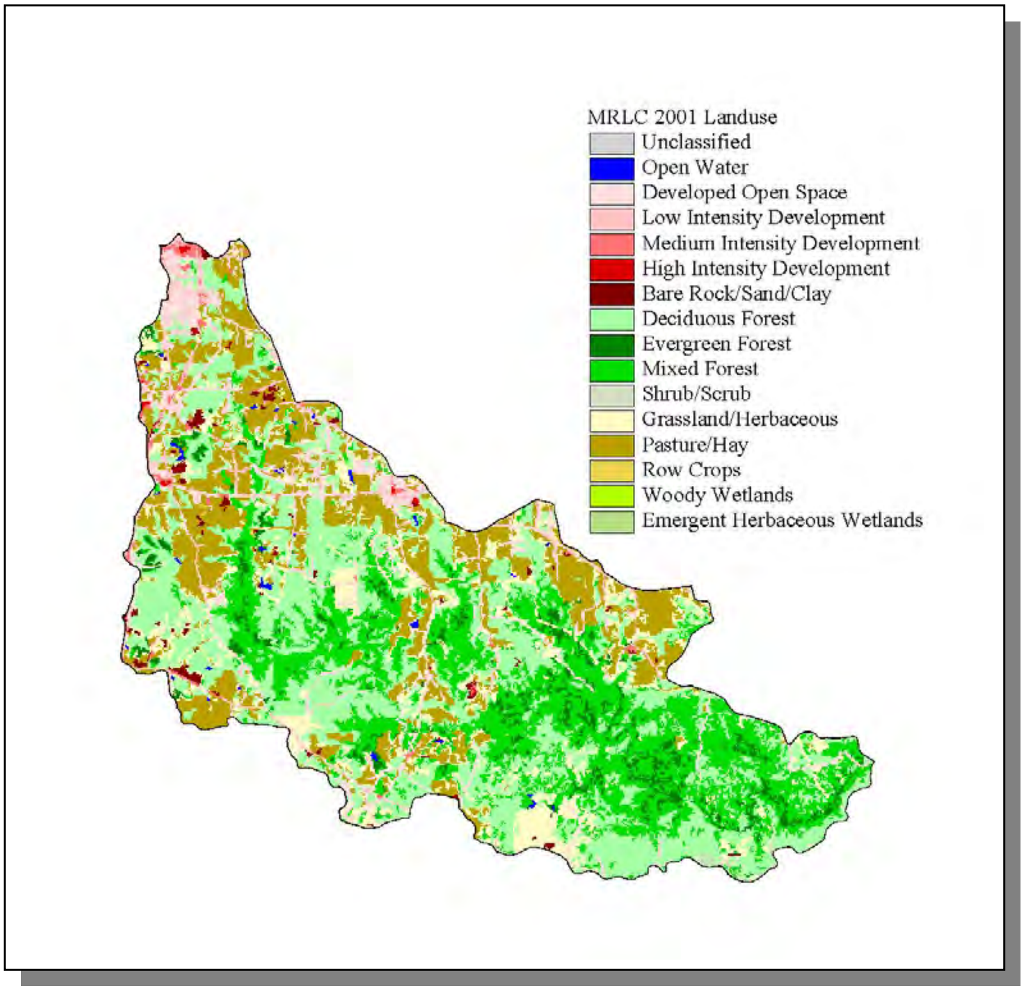

Figure 4-91. Illustration of Land Use Distribution in Subwatershed 051301040204.

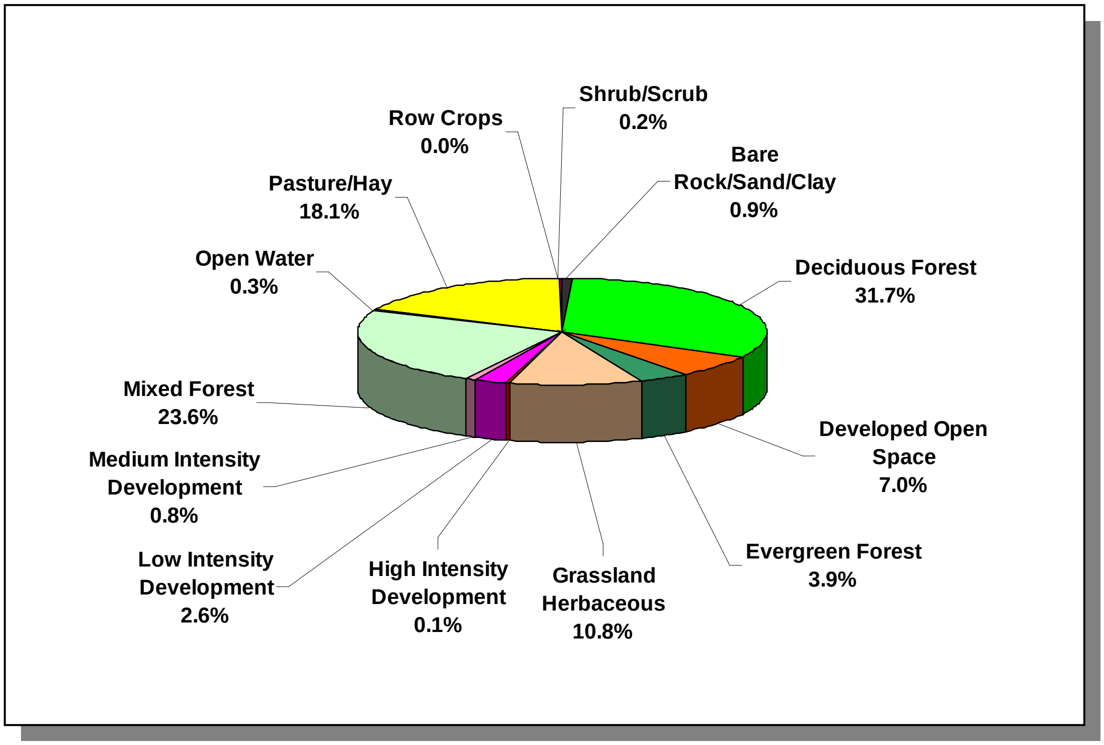

Figure 4-92. Land Use Distribution in Subwatershed 051301040204. *More information is provided in Appendix IV.*

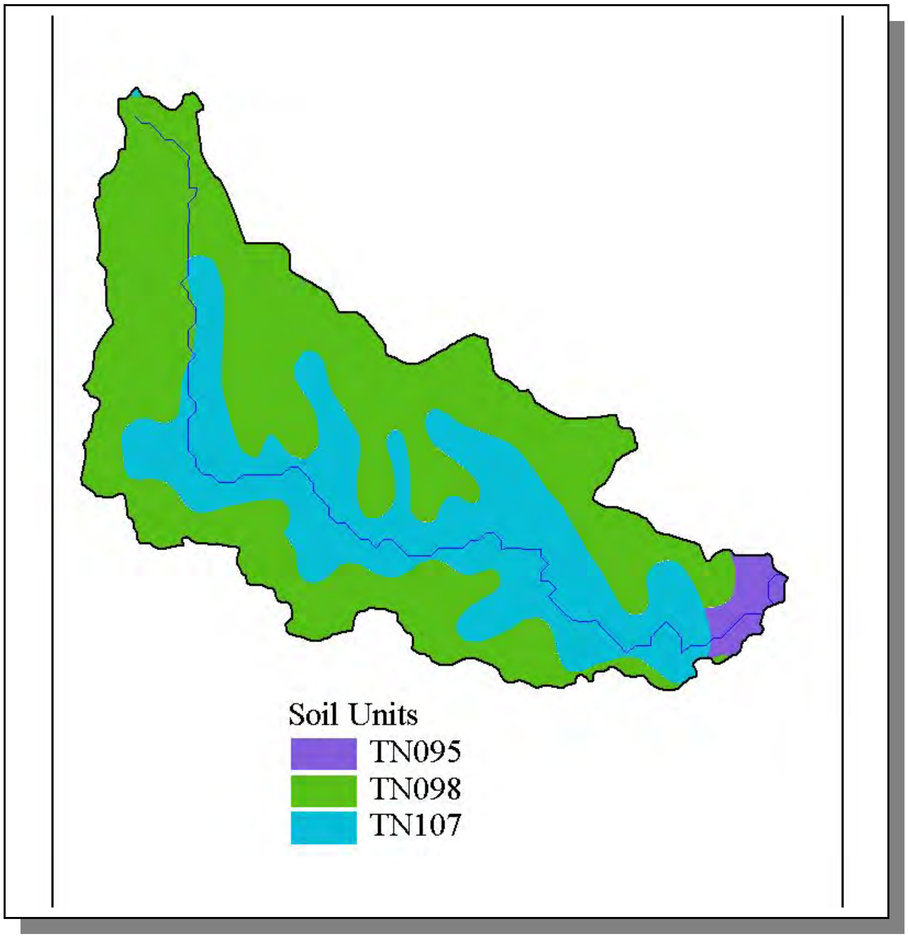

Figure 4-93. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040204.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN095	0.00	B	2.35	5.12	Loam	0.31
TN098	1.00	C	3.98	4.82	Loam	0.32
TN107	1.00	C	6.34	4.84	Loam	0.28

Table 4-70. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040204. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Fentress	14,669	15,920	16,625	6.52	956	1,037	1,083	13.3

Table 4-71. Population Estimates in Subwatershed 051301040204.

Figure 4-94. Location of Historical Streamflow Data Collection Sites in Subwatershed 051301040204. *More information is provided in Appendix IV.*

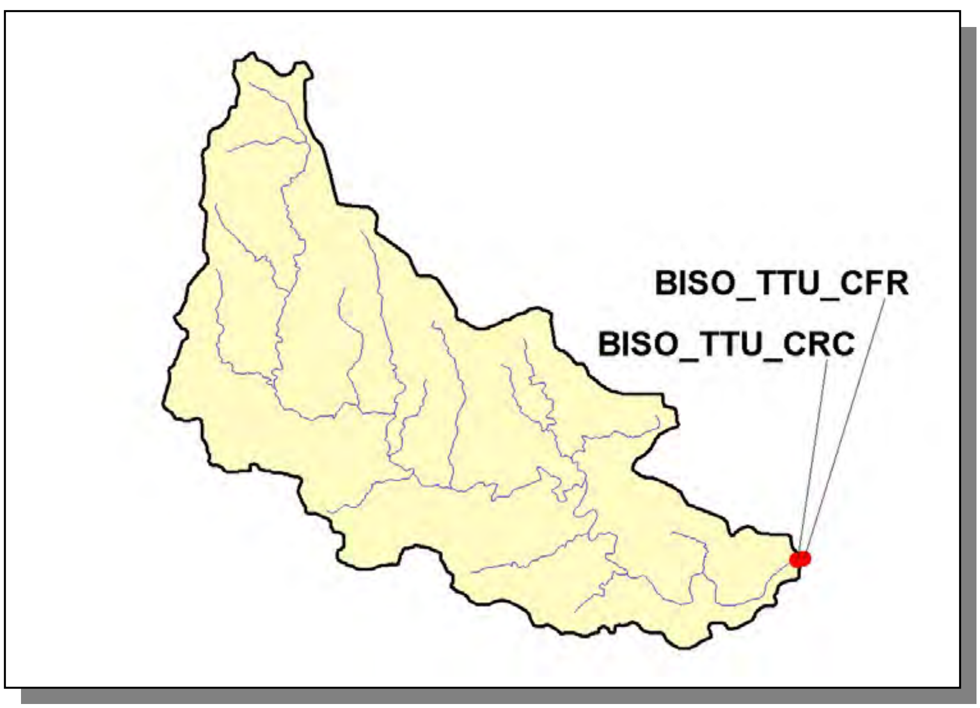

Figure 4-95. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301040204. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.B.iv.a. Point Source Contributions.

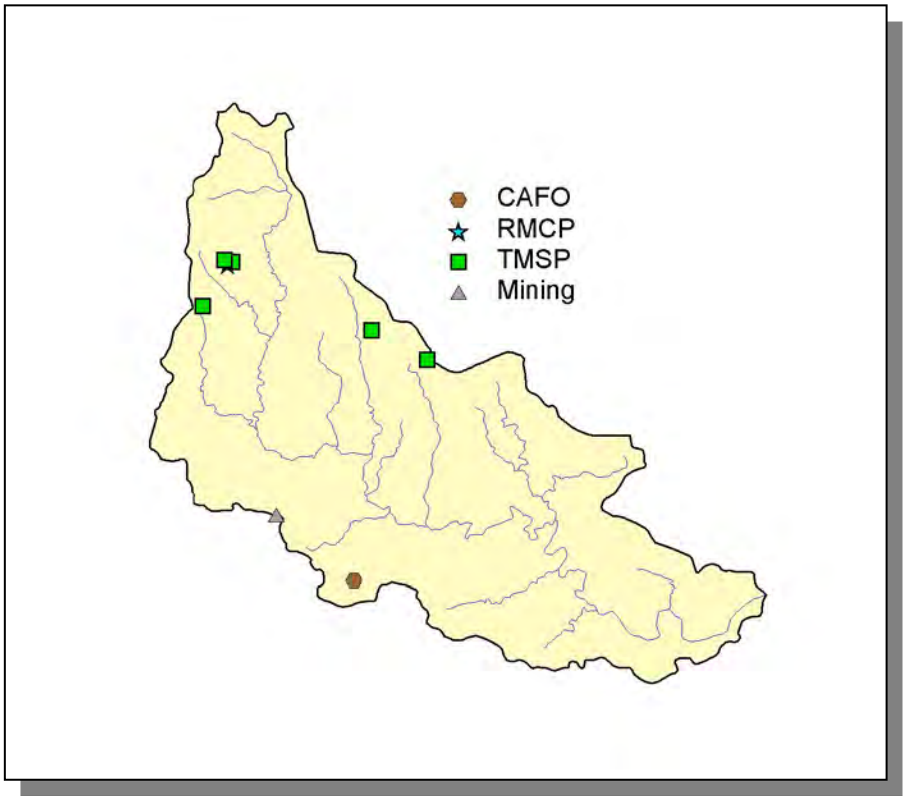

Figure 4-96. Location of Permits Issued in Subwatershed 051301040204. *More information, including the names of facilities, is provided in Appendix IV.*

Figure 4-97. Location of Active Mining Sites in Subwatershed 051301040204. *More information, including the names of mining operations, is provided in Appendix IV.*

Figure 4-98. Location of Concentrated Animal Feeding Operations (CAFO) in Subwatershed 0513010204. *More information, including the names of facilities, is provided in Appendix IV.*

Figure 4-99. Location of Ready Mix Concrete Plants (RMCP) in Subwatershed 051301040204. *More information is provided in Appendix IV.*

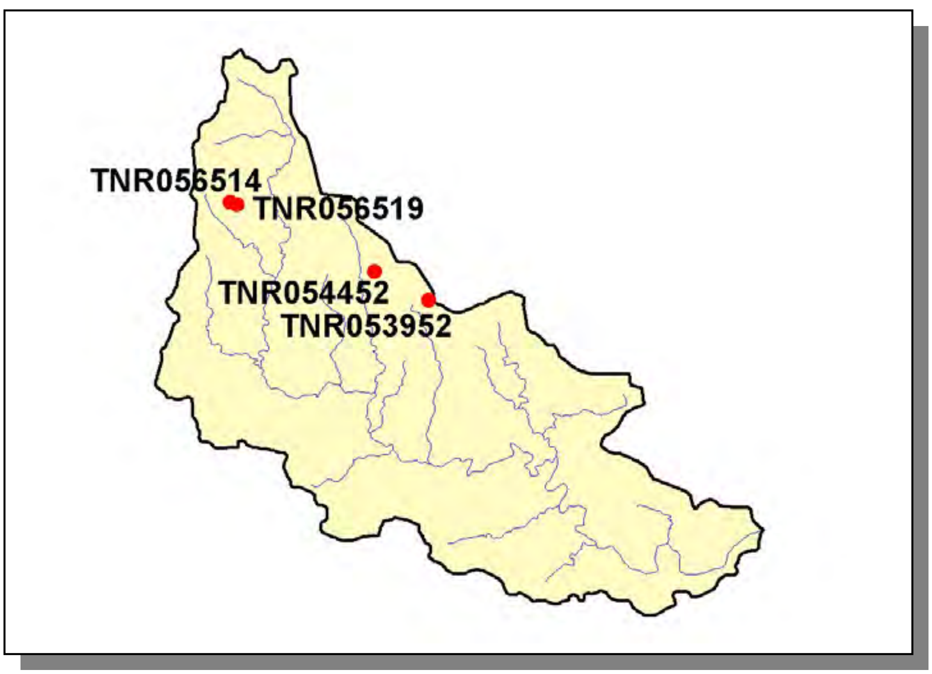

Figure 4-100. Location of TMSP Sites in Subwatershed 051301040204. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.B.iv.b. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
938	2,010	50	<5	848,987	85	9

Table 4-72. Summary of Livestock Count Estimates in Subwatershed 051301040204. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Chickens (Layers)	Hogs	Sheep
Fentress	8,058	17,259	430	7,290,026	474	729	79

Table 4-73. Summary of Livestock Count Estimates in Fentress County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Fentress	244.1	244.1	3.6	14.3

Table 4-74. Forest Acreage and Annual Removal Rates (1987-1994) in Fentress County.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.72
Legumes, Grass (Hayland)	0.56
Grass, Forbs, Legumes (Mixed Pasture)	0.27
Corn (Row Crops)	16.18
Soybeans (Row Crops)	6.00
Wheat (Close-Grown Cropland)	43.40
Other Vegetable and Truck Crops	15.94
Farmsteads and Ranch Headquarters	0.40

Table 4-75. Annual Estimated Total Soil Loss in Subwatershed 051301040204.

4.2.B.v. 051301040205 (Lower Clear Fork).

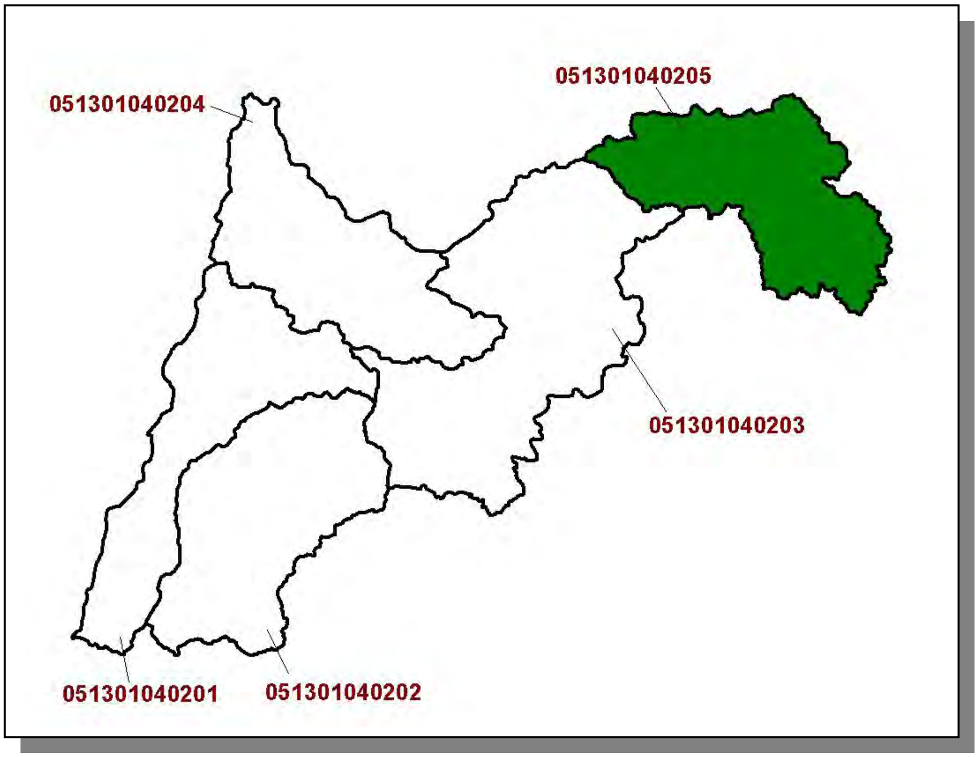

Figure 4-101. Location of Subwatershed 051301040205. All HUC-12 subwatershed boundaries are shown for reference.

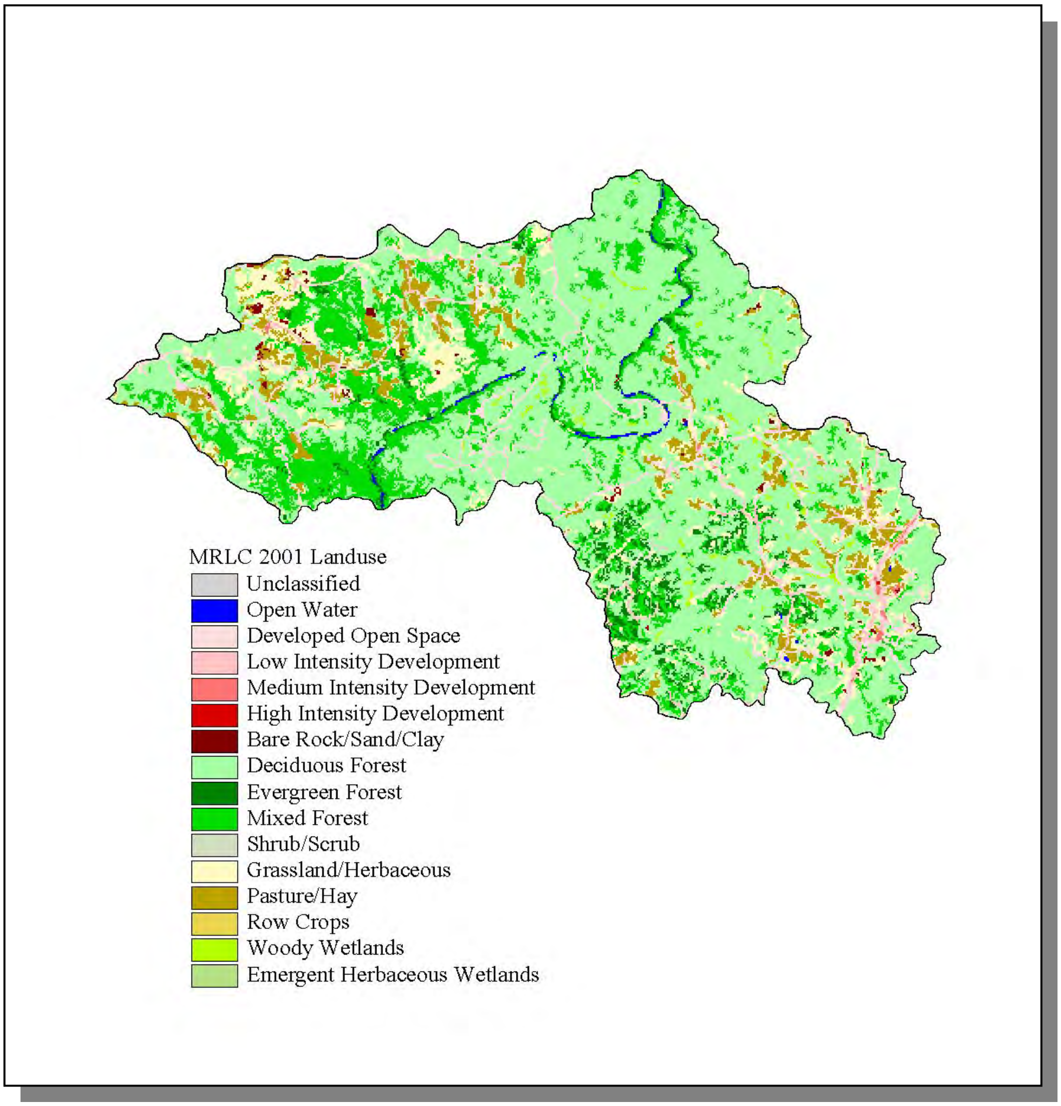

Figure 4-102. Illustration of Land Use Distribution in Subwatershed 051301040205.

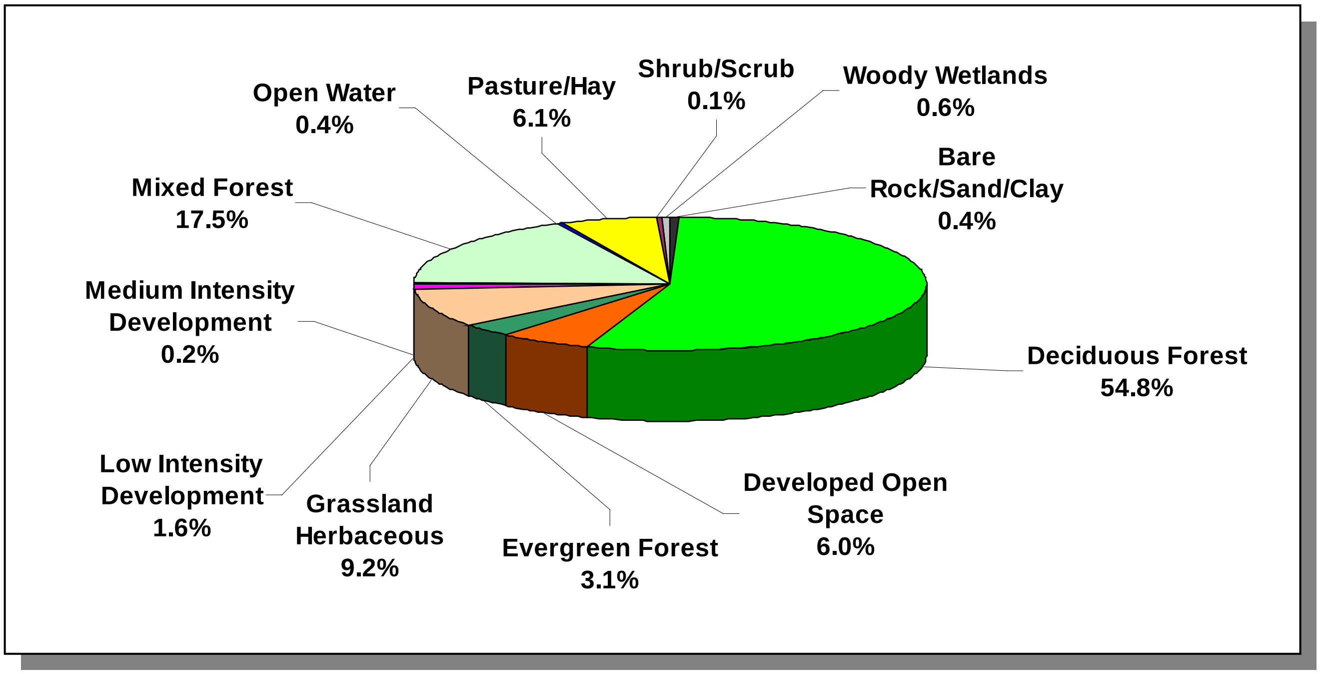

Figure 4-103. Land Use Distribution in Subwatershed 051301040205. *More information is provided in Appendix IV.*

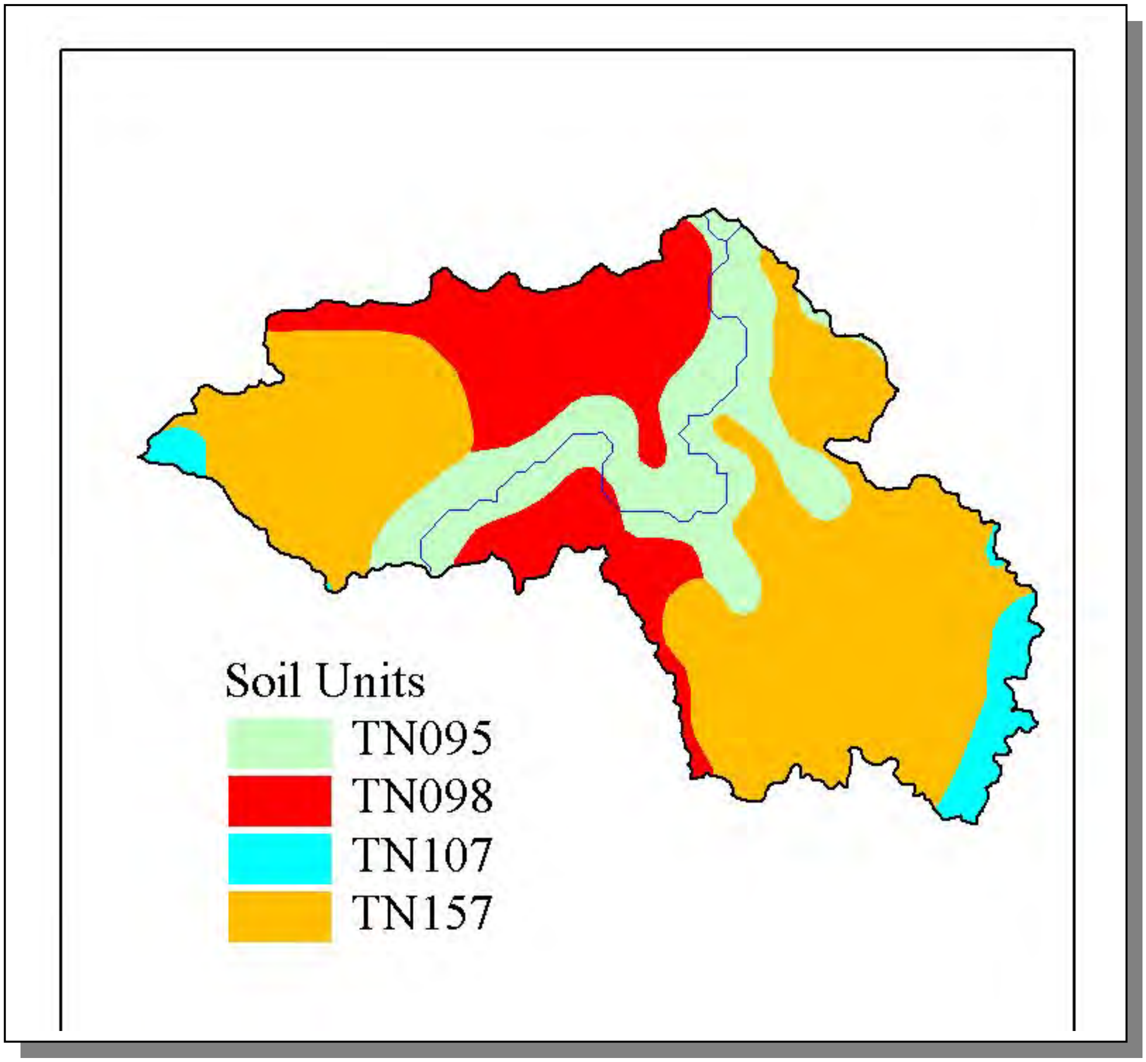

Figure 4-104. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040205.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN095	0.00	B	2.35	5.12	Loam	0.31
TN098	1.00	C	3.98	4.82	Loam	0.32
TN107	1.00	C	6.34	4.84	Loam	0.28
TN157	0.00	B	2.38	4.62	Loam	0.28

Table 4-76. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040205. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Fentress	14,669	15,920	16,625	1.75	257	279	292	13.6
Scott	18,358	19,816	21,127	4.06	745	804	857	15.0
Total	**33,027**	**35,736**	**37,752**		**1,002**	**1,083**	**1,149**	**14.7**

Table 4-77. Population Estimates in Subwatershed 051301040205.

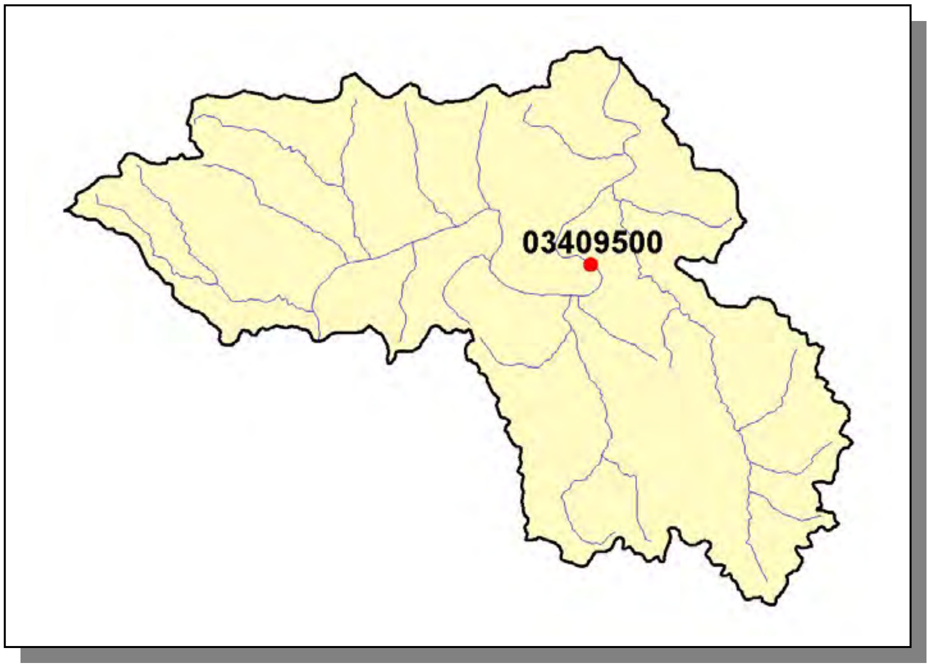

Figure 4-105. Location of Historical Streamflow Data Collection Sites in Subwatershed 051301040205. *More information is provided in Appendix IV.*

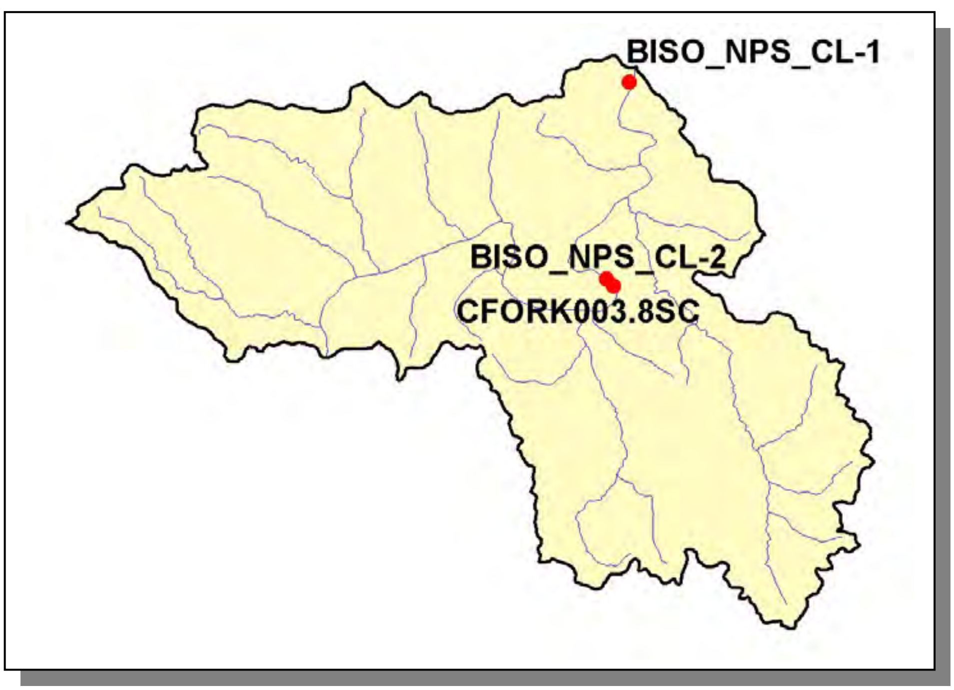

Figure 4-106. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301040205. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.B.v.a. Point Source Contributions.

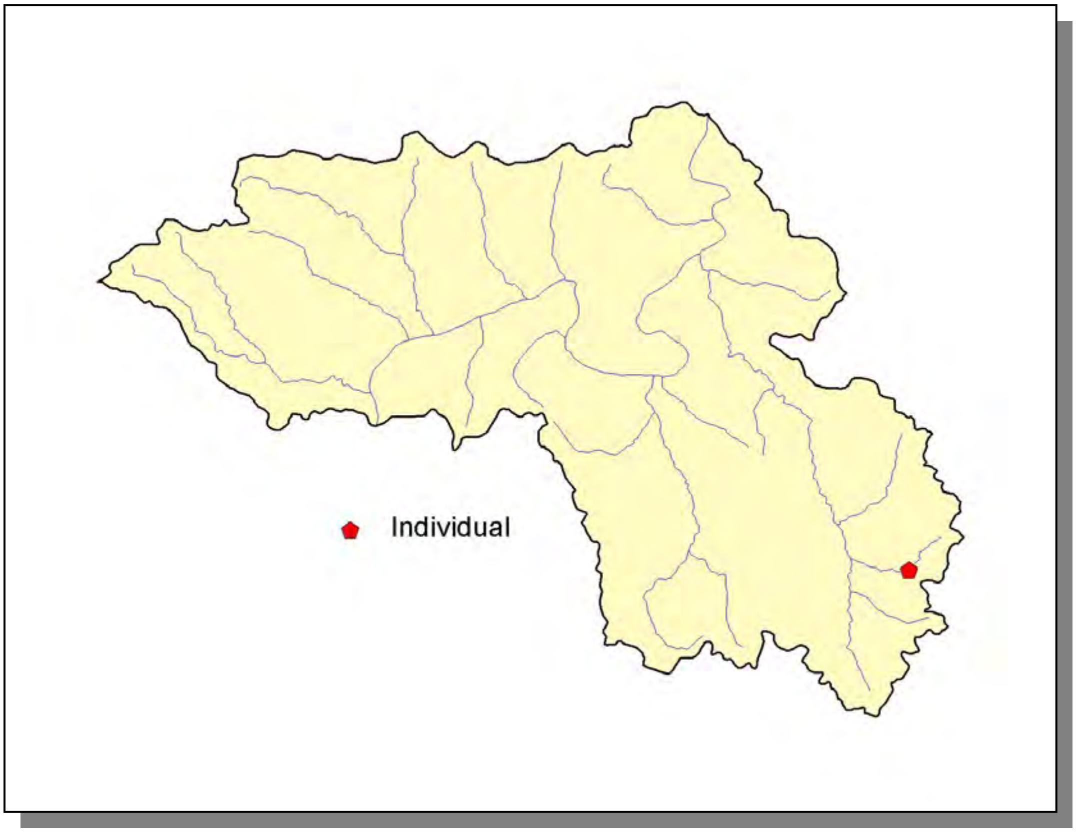

Figure 4-107. Location of Permits Issued in Subwatershed 051301040205. *More information, including the names of facilities, is provided in Appendix IV.*

Figure 4-108. Location of Active NPDES Sites in Subwatershed 051301040205. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.B.v.b. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
173	360	14	<5	157,730	7	<5

Table 4-78. Summary of Livestock Count Estimates in Subwatershed 051301040205. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Chickens (Layers)	Hogs	Sheep
Fentress	8,058	17,259	430	7,290,026	474	729	79
Scott	2,177	4,447	216	1,989,506	196	17	74

Table 4-79. Summary of Livestock Count Estimates in Fentress and Scott Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Fentress	244.1	244.1	3.6	14.3
Scott	300.3	300.3	5.5	21.4

Table 4-80. Forest Acreage and Annual Removal Rates (1987-1994) in Fentress and Scott Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.44
Legumes, Grass (Hayland)	0.56
Grass, Forbs, Legumes (Mixed Pasture)	0.49
Corn (Row Crops)	16.18
Soybeans (Row Crops)	6.00
Wheat (Close-Grown Cropland)	43.4
Other Vegetable and Truck Crops	15.94
Farmsteads and Ranch Headquarters	0.18

Table 4-81. Annual Estimated Total Soil Loss in Subwatershed 051301040205.

4.2.C. 0513010403.

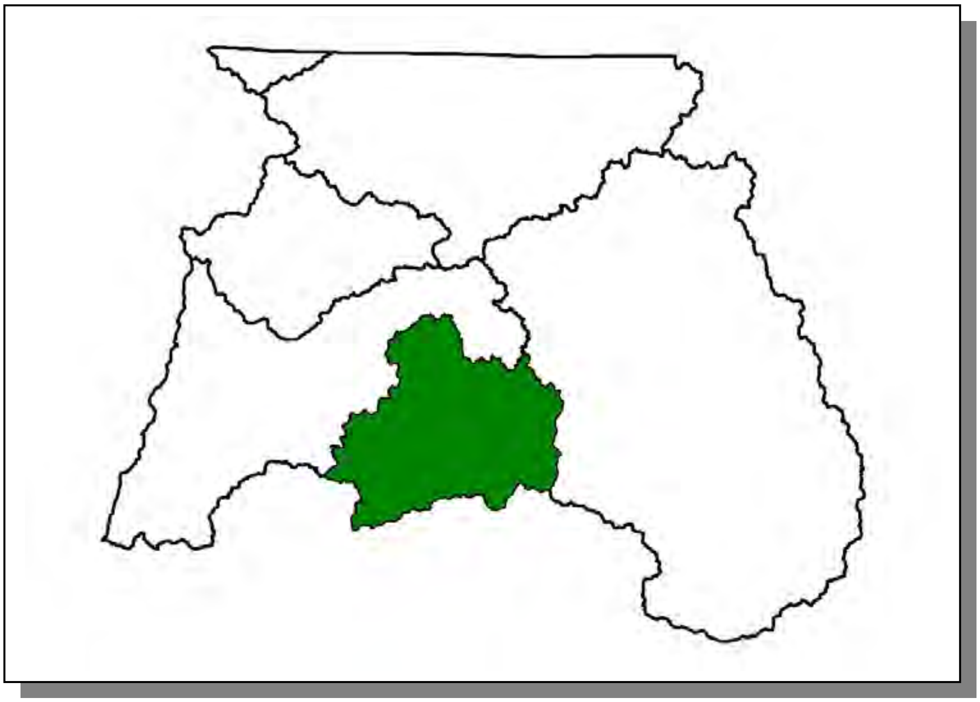

Figure 4-109. Location of Subwatershed 0513010403. *All South Fork Cumberland River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.3.C.i. 051301040301 (Upper Whiteoak Creek).

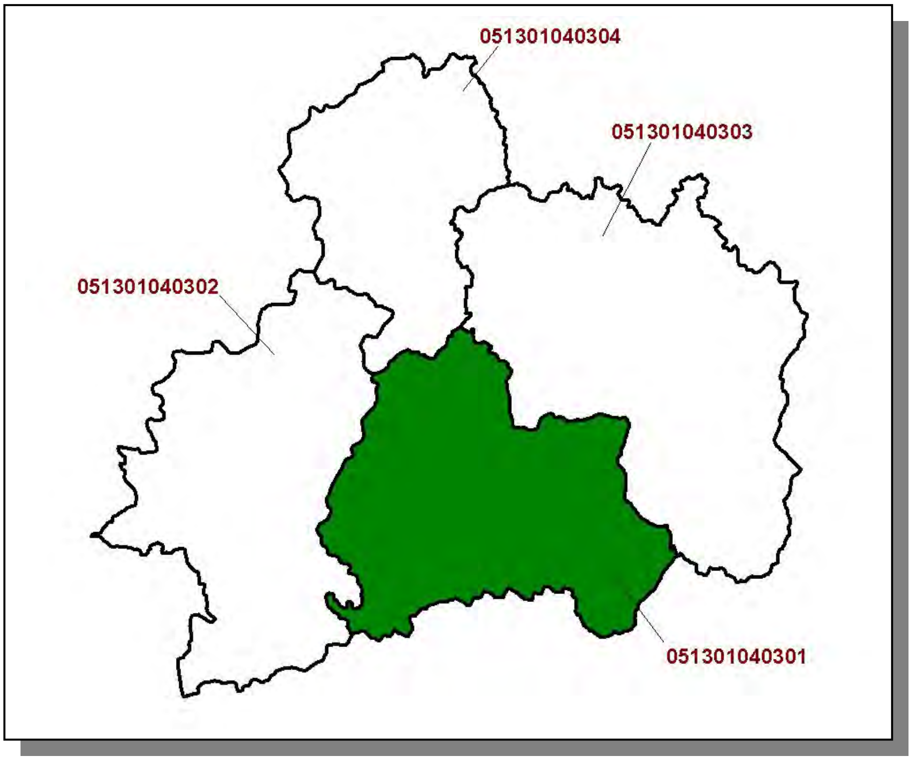

Figure 4-110. Location of Subwatershed 051301040301. *All HUC-12 subwatershed boundaries are shown for reference.*

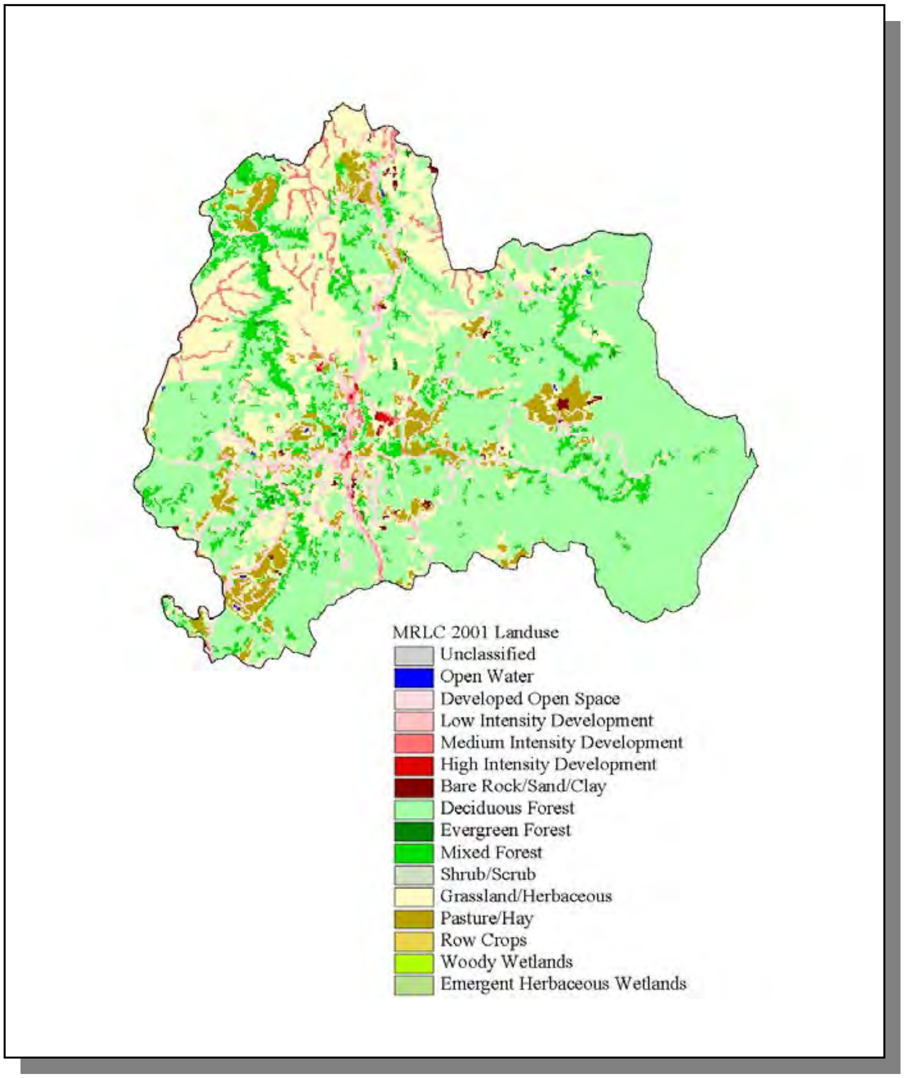

Figure 4-111. Illustration of Land Use Distribution in Subwatershed 051301040301.

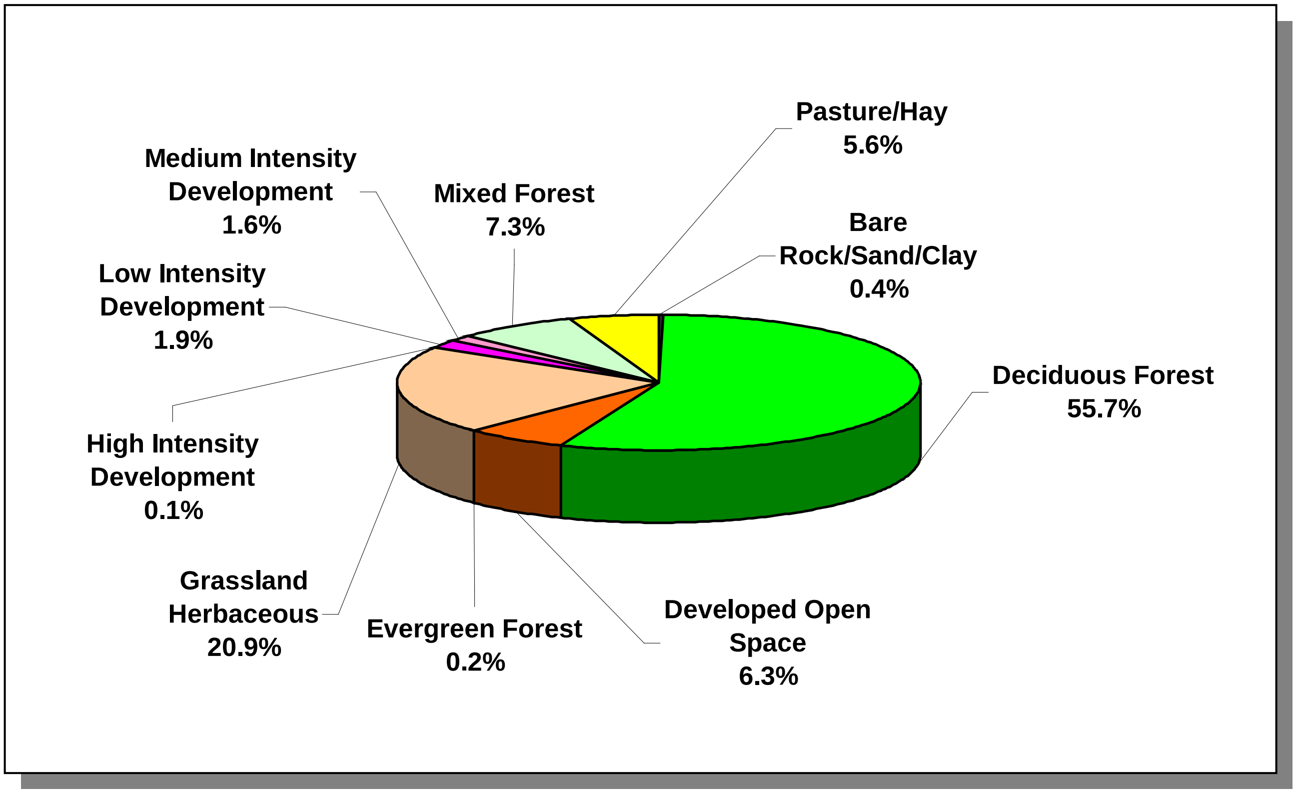

Figure 4-112. Land Use Distribution in Subwatershed 051301040301. *More information is provided in Appendix IV.*

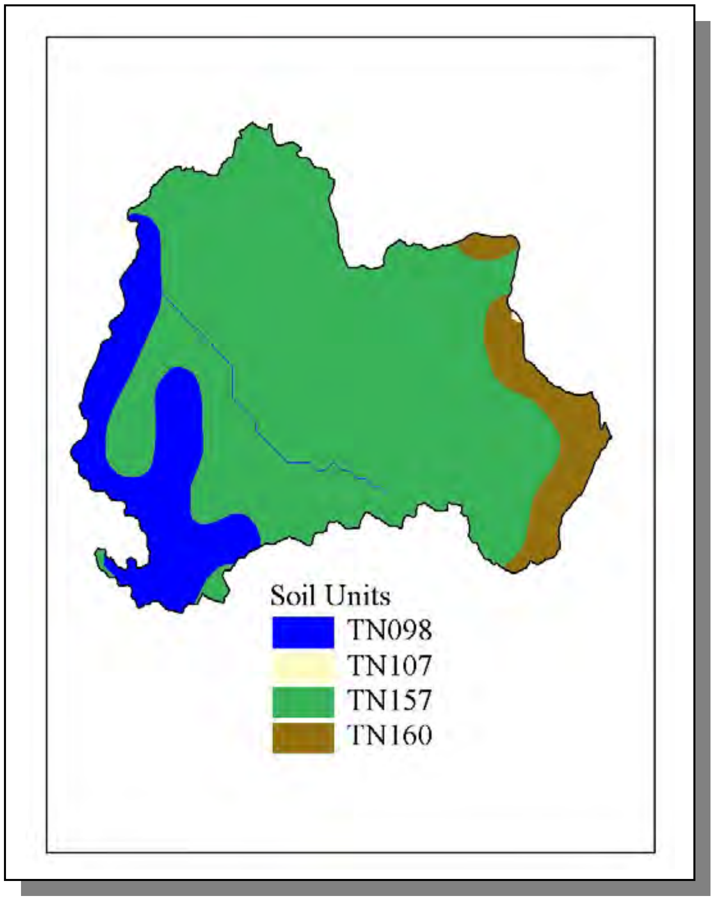

Figure 4-113. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040301.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN098	1.00	C	3.98	4.82	Loam	0.32
TN107	1.00	C	6.34	4.84	Loam	0.28
TN157	0.00	B	2.38	4.62	Loam	0.28
TN160	0.00	B	2.69	5.36	Loam	0.25

Table 4-82. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040301. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Morgan	17,300	18,521	19,757	5.06	876	938	1,000	14.2

Table 4-83. Population Estimates in Subwatershed 051301040301.

Figure 4-114. Location of Historical Streamflow Data Collection Sites in Subwatershed 051301040301. *More information is provided in Appendix IV.*

Figure 4-115. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301040301. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.C.i.a. Point Source Contributions.

There are no point source contributions in this subwatershed.

4.2.C.i.b. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
225	423	12	<5	71,795	4	<5

Table 4-84. Summary of Livestock Count Estimates in Subwatershed 051301040301. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Chickens (Layers)	Hogs	Sheep
Morgan	4,697	8,853	251	1,501,559	194	83	35

Table 4-85. Summary of Livestock Count Estimates in Morgan County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Morgan	287.8	276.2	3.5	10.9

Table 4-86. Forest Acreage and Annual Removal Rates (1987-1994) in Morgan County.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.42
Grass (Hayland)	0.77
Legumes, Grass (Hayland)	0.21
Grass, Forbs, Legumes (Mixed Pasture)	0.11
Corn (Row Crops)	7.18
Farmsteads and Ranch Headquarters	0.04

Table 4-87. Annual Estimated Total Soil Loss in Subwatershed 051301040301.

4.3.C.ii. 051301040302 (Camp Creek).

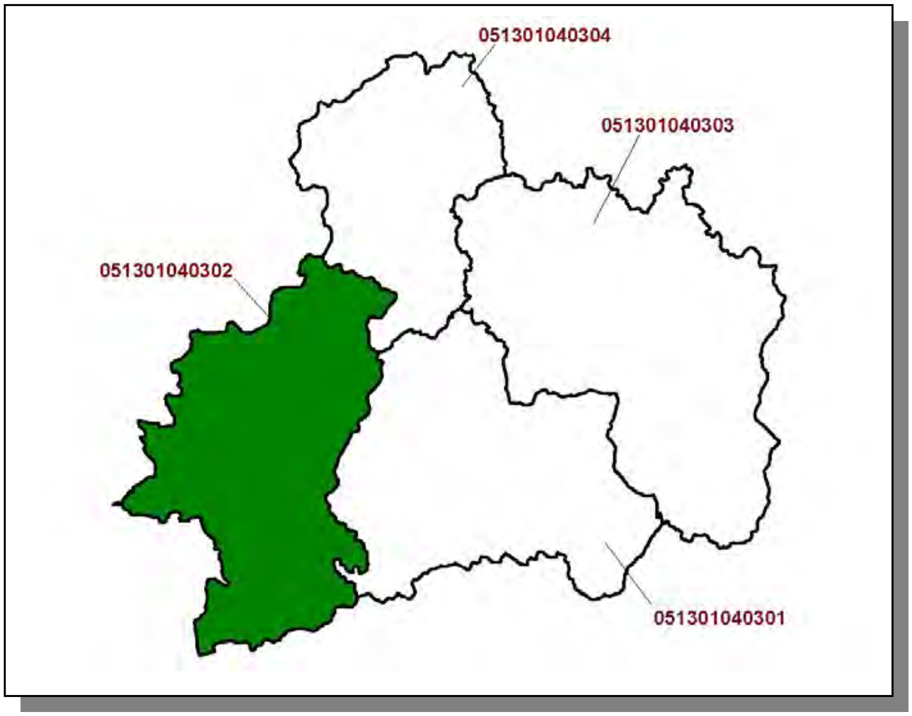

Figure 4-116. Location of Subwatershed 051301040302. *All HUC-12 subwatershed boundaries are shown for reference.*

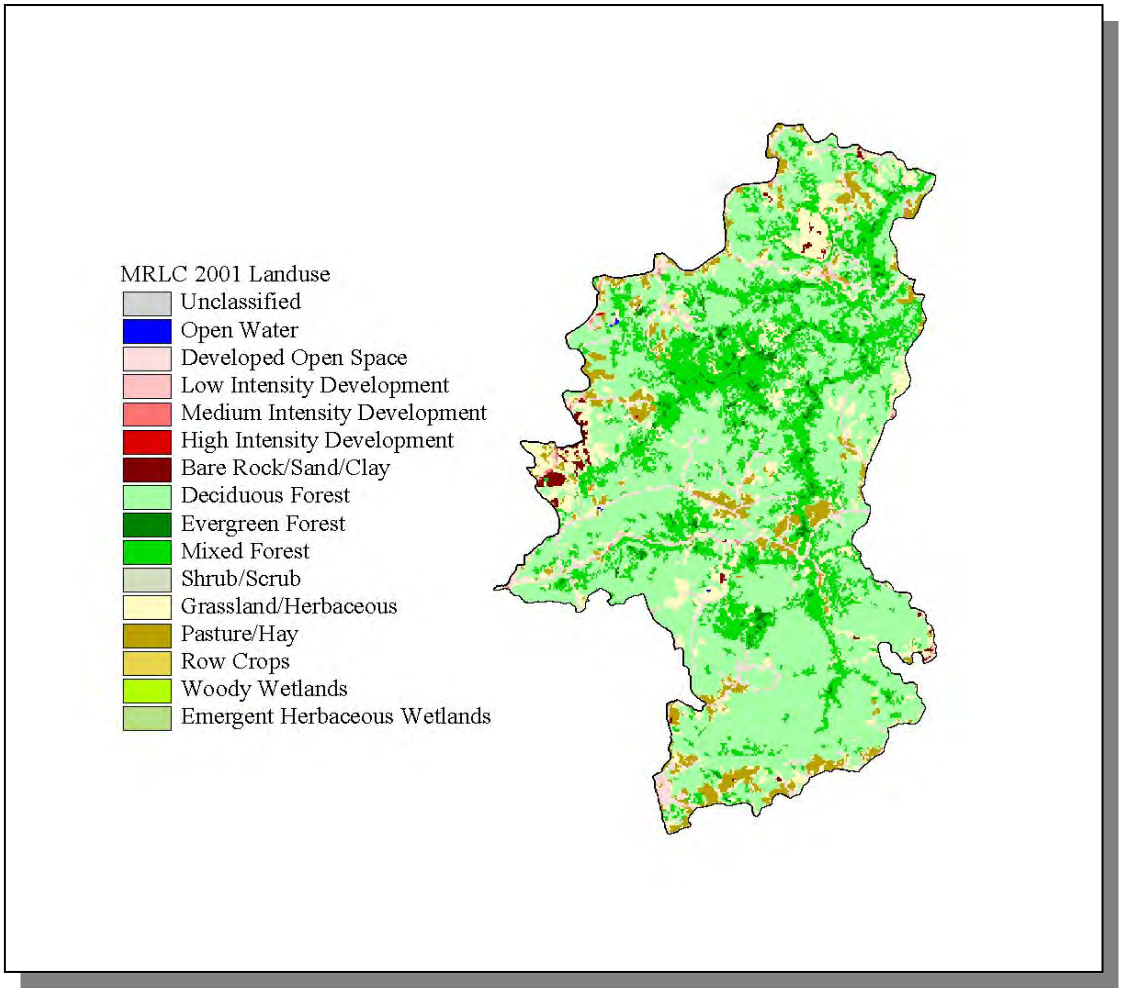

Figure 4-117. Illustration of Land Use Distribution in Subwatershed 051301040302.

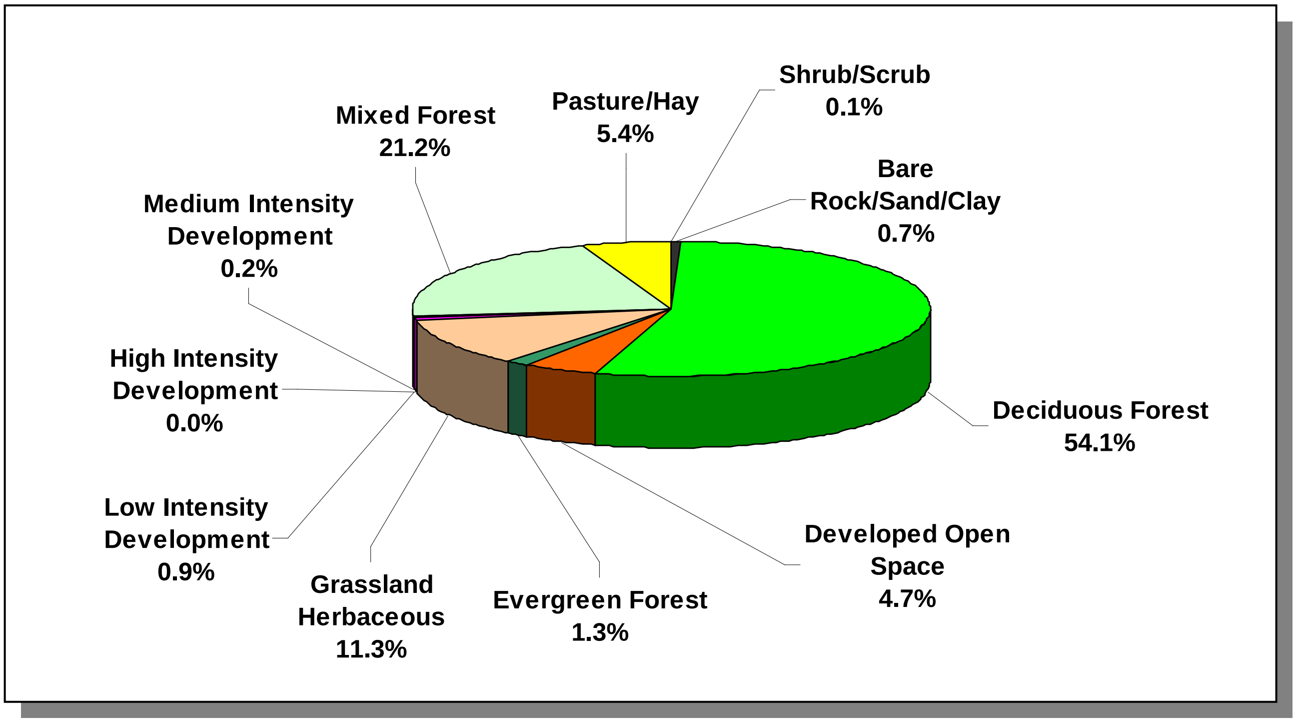

Figure 4-118. Land Use Distribution in Subwatershed 051301040302. *More information is provided in Appendix IV.*

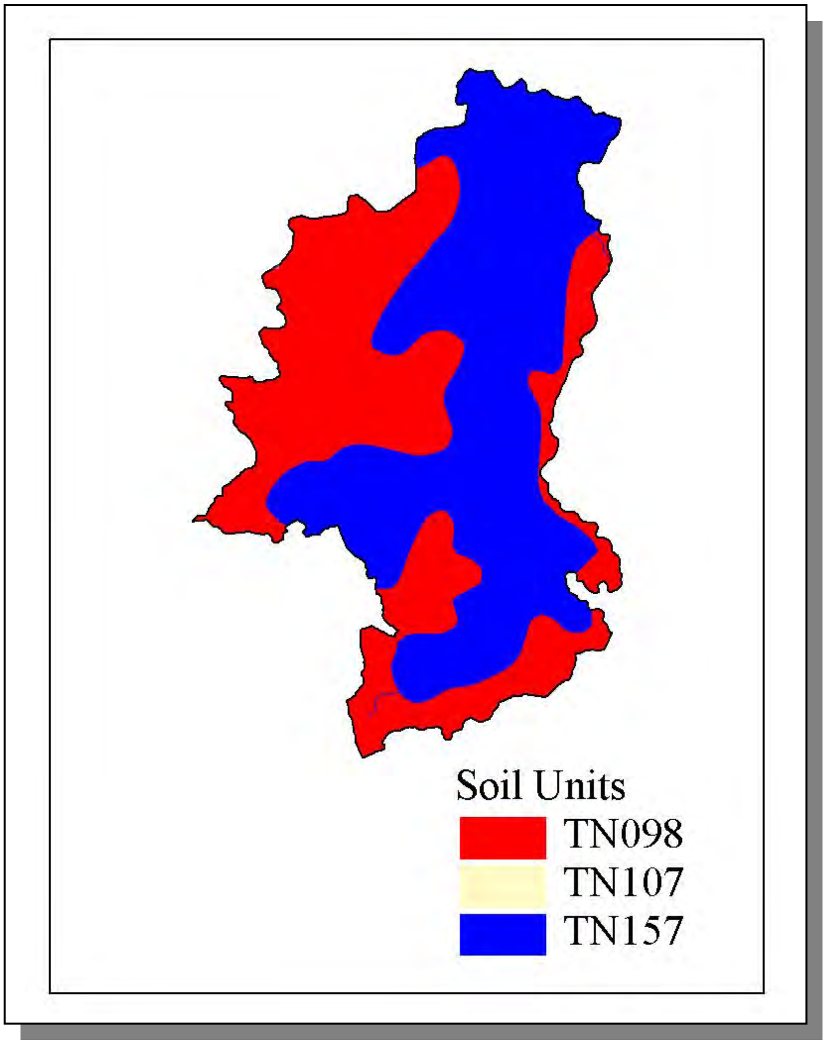

Figure 4-119. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040302.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN098	1.00	C	3.98	4.82	Loam	0.32
TN107	1.00	C	6.34	4.84	Loam	0.28
TN157	0.00	B	2.38	4.62	Loam	0.28

Table 4-88. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040302. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Morgan	17,300	18,521	19,757	5.1	883	945	1,008	14.2

Table 4-89. Population Estimates in Subwatershed 051301040302.

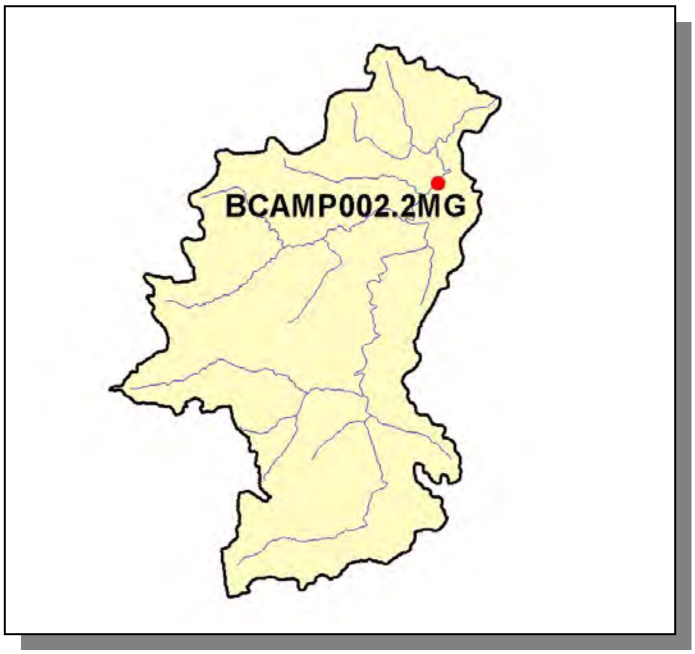

Figure 4-120. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301040302. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.C.ii.a. Point Source Contributions.

There are no point source contributions in this subwatershed.

4.2.C.ii.b. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
265	500	14	<5	84,750	5	<5

Table 4-90. Summary of Livestock Count Estimates in Subwatershed 051301040302. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Chickens (Layers)	Hogs	Sheep
Morgan	4,697	8,853	251	1,501,559	194	83	35

Table 4-91. Summary of Livestock Count Estimates in Morgan County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Morgan	287.8	276.2	3.5	10.9

Table 4-92. Forest Acreage and Annual Removal Rates (1987-1994) in Morgan County.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.42
Grass (Hayland)	0.77
Legumes, Grass (Hayland)	0.21
Grass, Forbs, Legumes (Mixed Pasture)	0.11
Corn (Row Crops)	7.18
Farmsteads and Ranch Headquarters	0.04

Table 4-93. Annual Estimated Total Soil Loss in Subwatershed 051301040302.

4.3.C.iii. 051301040303 (Black Wolf Creek).

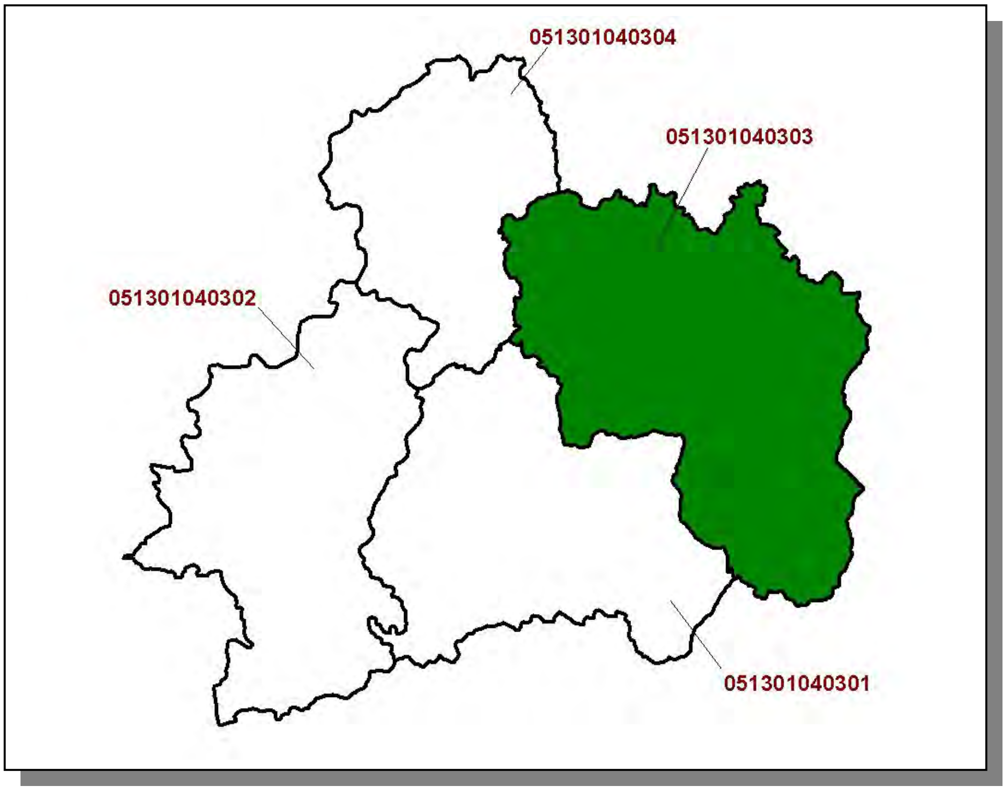

Figure 4-121. Location of Subwatershed 051301040303. *All HUC-12 subwatershed boundaries are shown for reference.*

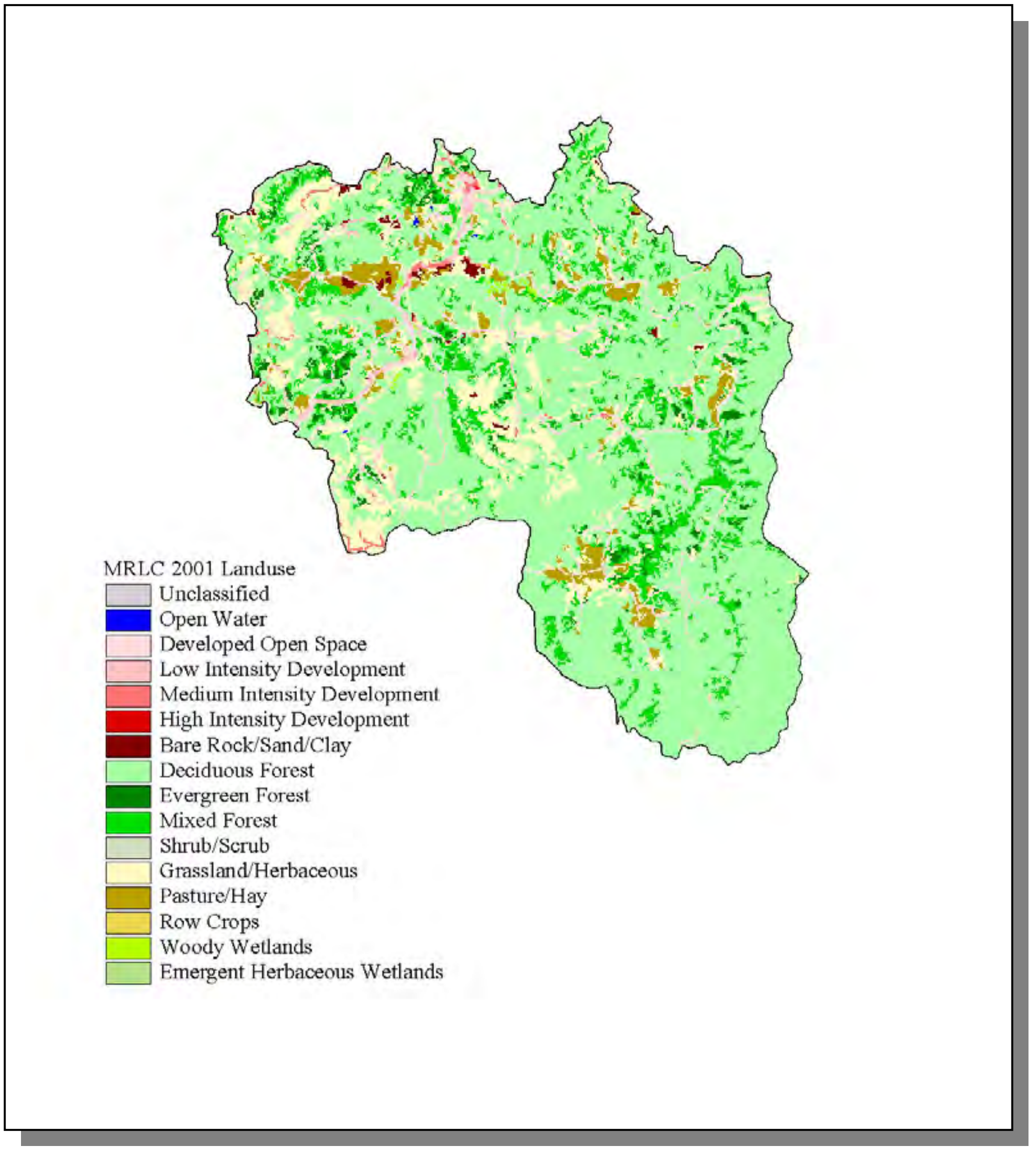

Figure 4-122. Illustration of Land Use Distribution in Subwatershed 051301040303.

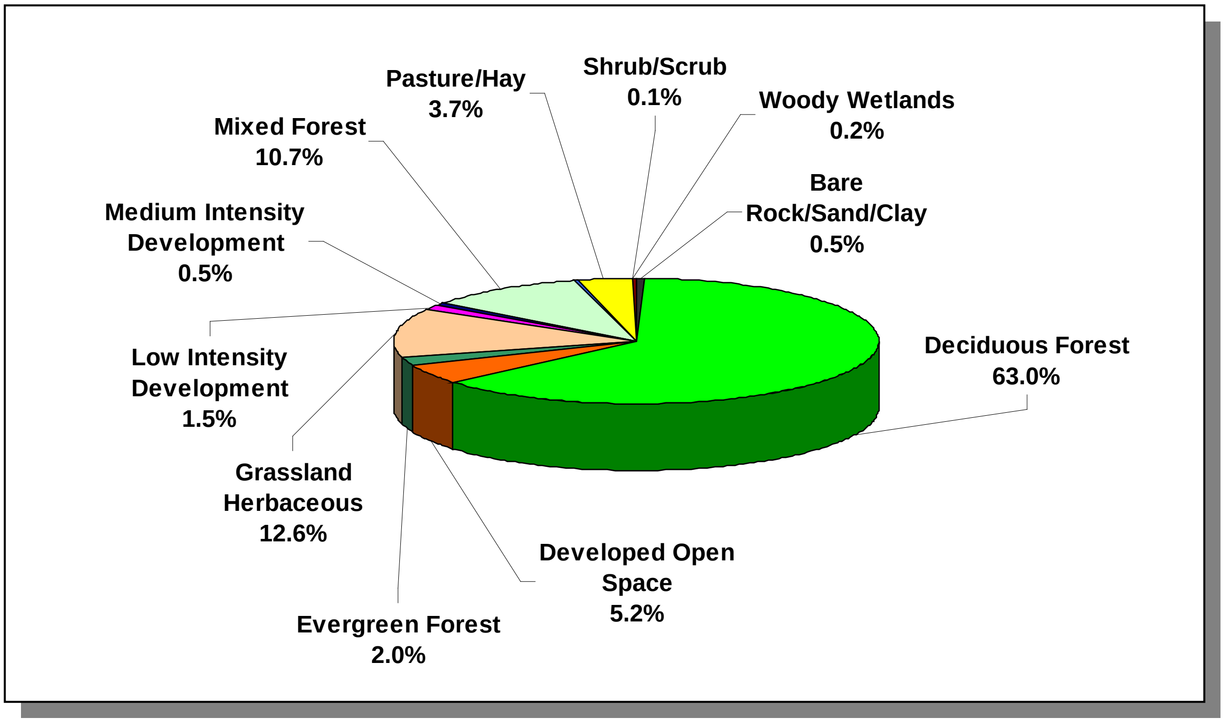

Figure 4-123. Land Use Distribution in Subwatershed 051301040303. *More information is provided in Appendix IV.*

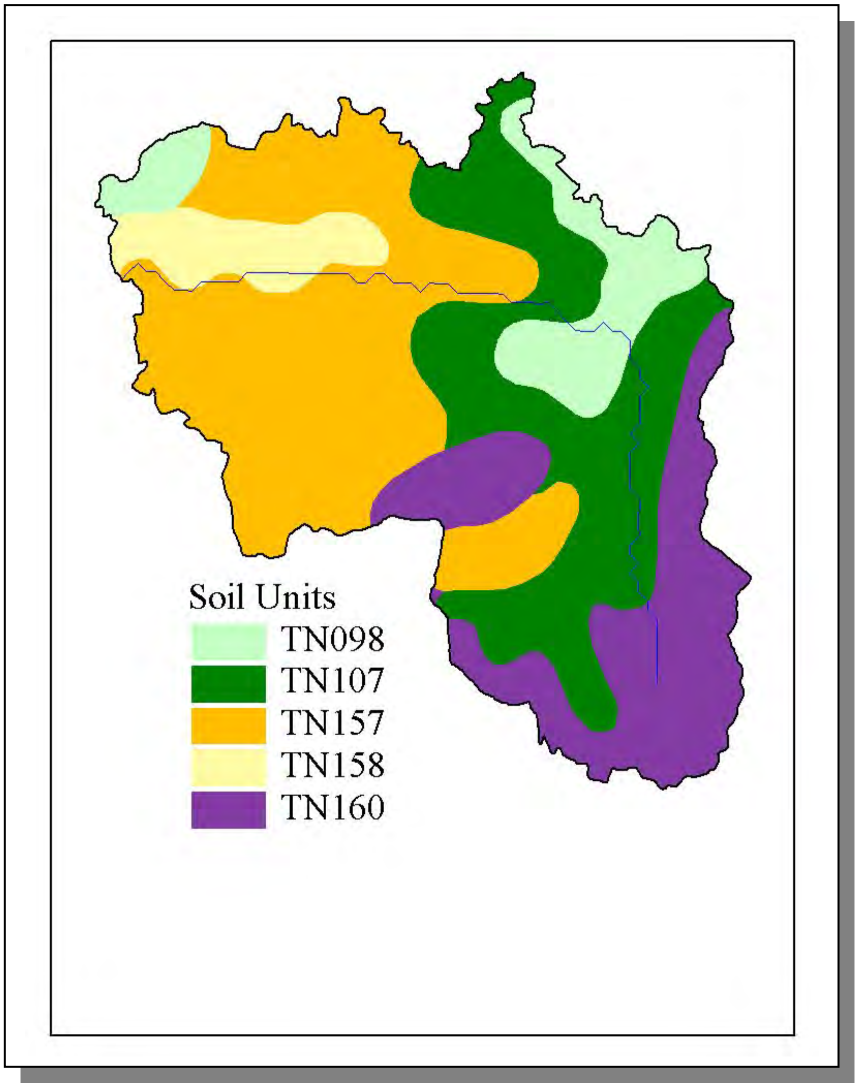

Figure 4-124. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040303.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN098	1.00	C	3.98	4.82	Loam	0.32
TN107	1.00	C	6.34	4.84	Loam	0.28
TN157	0.00	B	2.38	4.62	Loam	0.28
TN158	22.00	C	1.89	5.14	Silty Loam	0.29
TN160	0.00	B	2.69	5.36	Loam	0.25

Table 4-94. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040303. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Morgan	17,300	18,521	19,757	2.14	370	396	423	14.3
Scott	18,358	19,816	21,127	4.18	767	828	883	15.1
Total	**35,658**	**38,337**	**40,884**		**1,137**	**1,224**	**1,306**	**14.9**

Table 4-95. Population Estimates in Subwatershed 051301040303.

Figure 4-125. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301040303. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.C.iii.a. Point Source Contributions.

There are no point source contributions in this subwatershed.

4.2.C.iii.b. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
184	359	14	<5	106,571	<5	4

Table 4-96. Summary of Livestock Count Estimates in Subwatershed 051301040303. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* **"***Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Chickens (Layers)	Hogs	Sheep
Morgan	4,697	8,853	251	1,501,559	194	83	35
Scott	2,177	4,447	216	1,989,506	196	17	74

Table 4-97. Summary of Livestock Count Estimates in Morgan and Scott Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* **"***Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Morgan	287.8	276.2	3.5	10.9
Scott	300.3	300.3	5.5	21.4

Table 4-98. Forest Acreage and Annual Removal Rates (1987-1994) in Morgan and Scott Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.36
Grass (Hayland)	0.77
Legumes, Grass (Hayland)	0.21
Grass, Forbs, Legumes (Mixed Pasture)	0.43
Corn (Row Crops)	7.18
Farmsteads and Ranch Headquarters	0.07

Table 4-99. Annual Estimated Total Soil Loss in Subwatershed 051301040303.

4.3.C.iv. 051301040304 (Lower Whiteoak Creek).

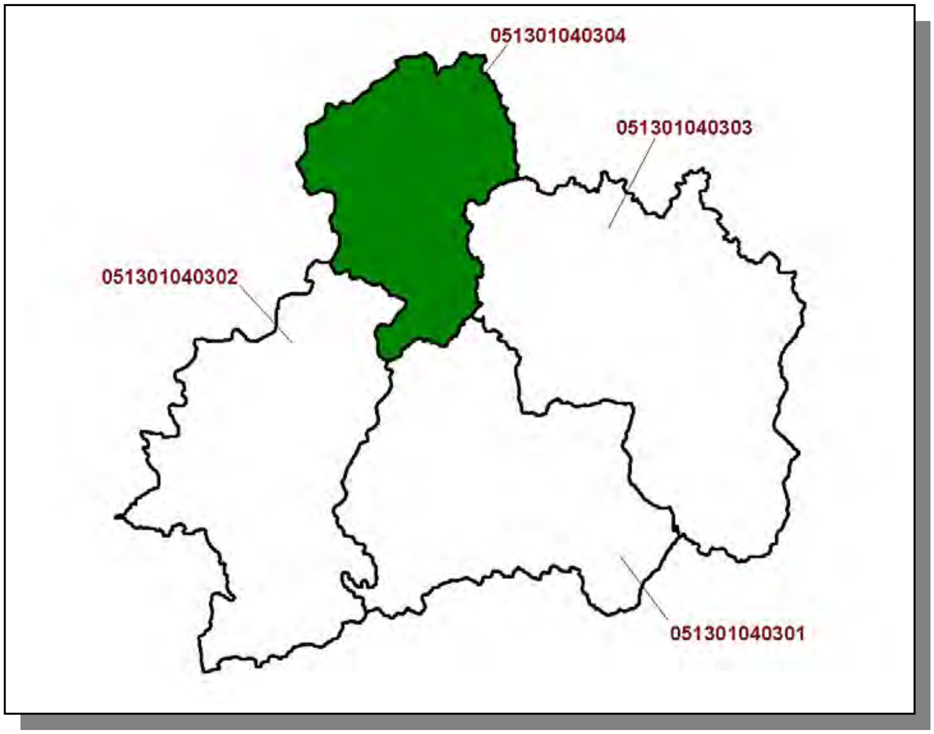

Figure 4-126. Location of Subwatershed 051301040304. *All South Fork Cumberland River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

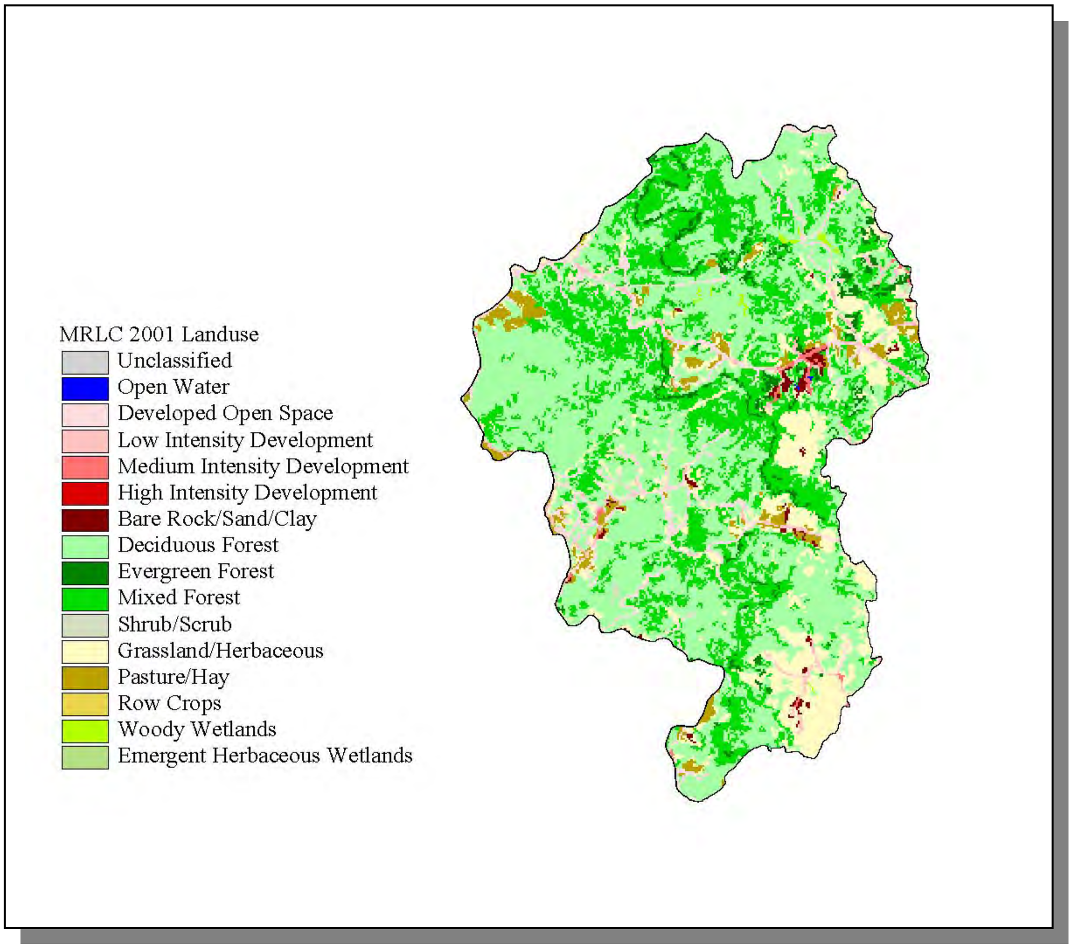

Figure 4-127. Illustration of Land Use Distribution in Subwatershed 051301040304.

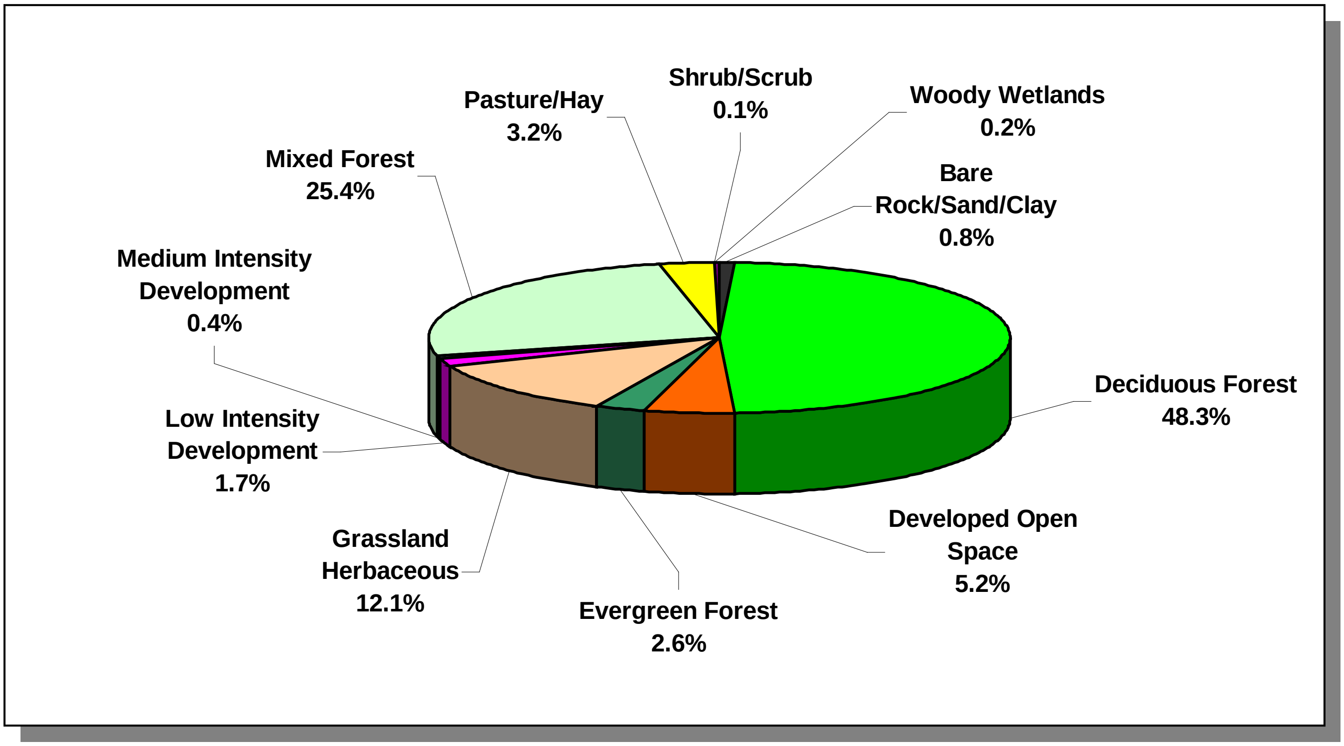

Figure 4-128. Land Use Distribution in Subwatershed 051301040304. *More information is provided in Appendix IV.*

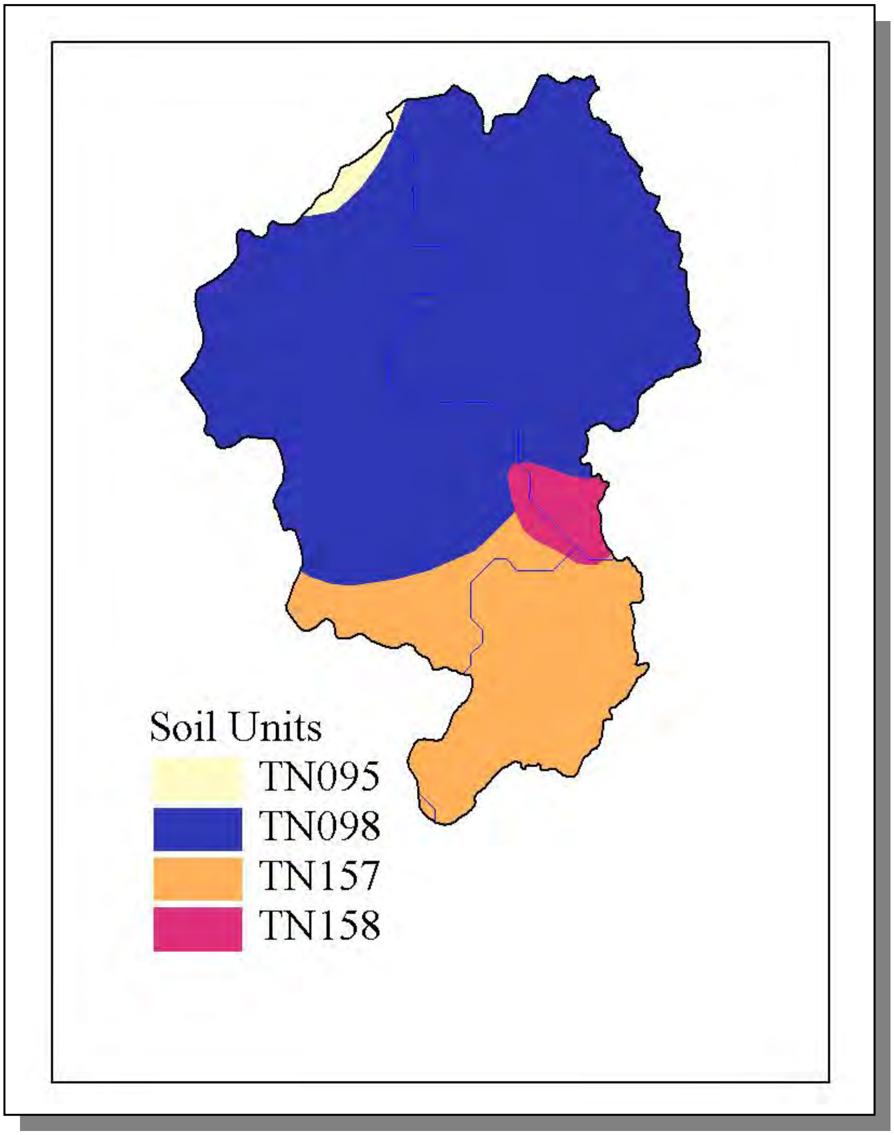

Figure 4-129. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040304.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN095	0.00	B	2.35	5.12	Loam	0.31
TN098	1.00	C	3.98	4.82	Loam	0.32
TN157	0.00	B	2.38	4.62	Loam	0.28
TN158	22.00	C	1.89	5.14	Silty Loam	0.29

Table 4-100. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040304. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Morgan	17,300	18,521	19,757	2.35	406	435	464	14.3
Scott	18,358	19,816	21,127	0.88	161	174	185	14.9
Total	**35,658**	**38,337**	**40,884**		**567**	**609**	**649**	**14.5**

Table 4-101. Population Estimates in Subwatershed 051301040304.

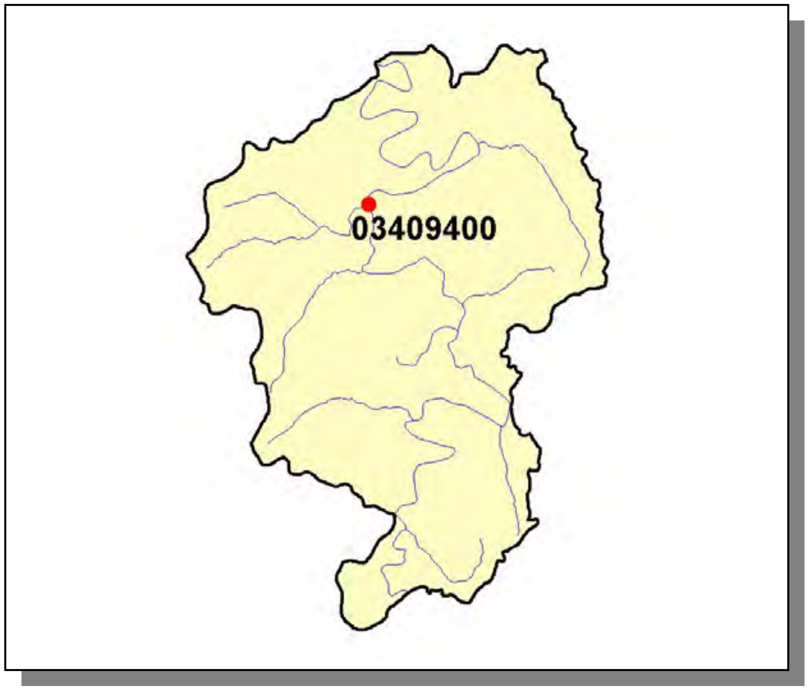

Figure 4-130. Location of Historical Streamflow Data Collection Sites in Subwatershed 051301040304. *More information is provided in Appendix IV.*

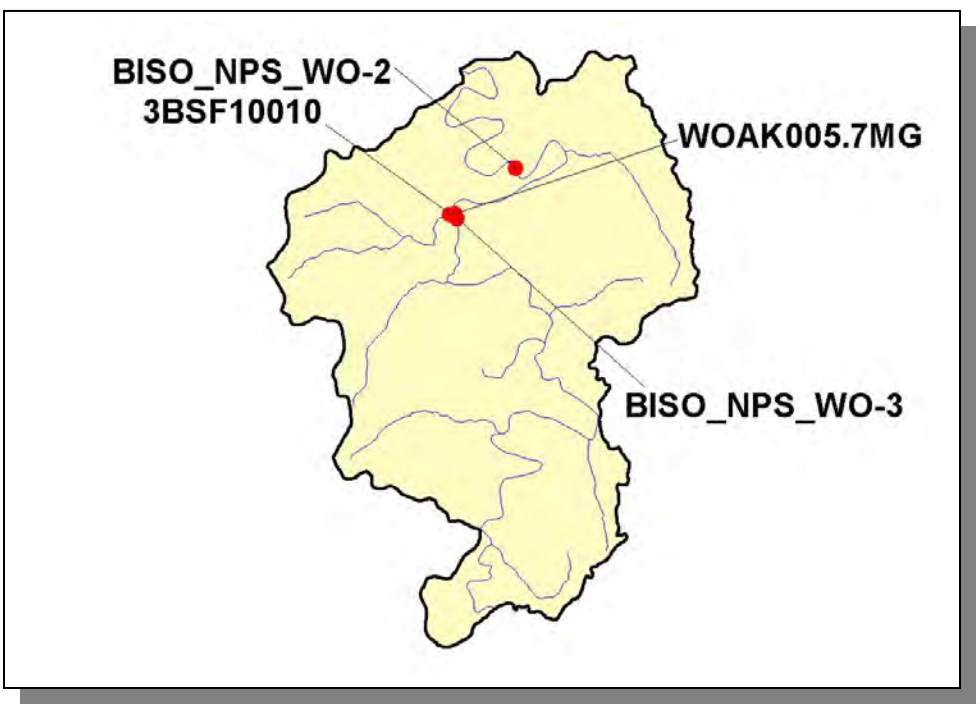

Figure 4-131. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301040304. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.C.iv.a. Point Source Contributions.

There are no point source contributions in this subwatershed.

4.2.C.iv.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Hogs	Sheep
143	273	9	59,300	<5	<5

Table 4-102. Summary of Livestock Count Estimates in Subwatershed 051301040304. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Chickens (Layers)	Hogs	Sheep
Fentress	8,058	17,259	430	7,290,026	474	729	79
Morgan	4,697	8,853	251	1,501,559	194	83	35
Scott	2,177	4,447	216	1,989,506	196	17	74

Table 4-103. Summary of Livestock Count Estimates in Fentress, Morgan, and Scott Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Fentress	244.1	244.1	3.6	14.3
Morgan	287.8	276.2	3.5	10.9
Scott	300.3	300.3	5.5	21.4

Table 4-104. Forest Acreage and Annual Removal Rates (1987-1994) in Fentress, Morgan, and Scott Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.40
Grass (Hayland)	0.77
Legumes, Grass (Hayland)	0.21
Grass, Forbs, Legumes (Mixed Pasture)	0.24
Corn (Row Crops)	7.18
Soybeans (Row Crops)	6.00
Wheat (Close-Grown Cropland)	43.40
Other Vegetable and Truck Crops	15.94
Farmsteads and Ranch Headquarters	0.05

Table 4-105. Annual Estimated Total Soil Loss in Subwatershed 051301040304.

4.2.D. 0513010404.

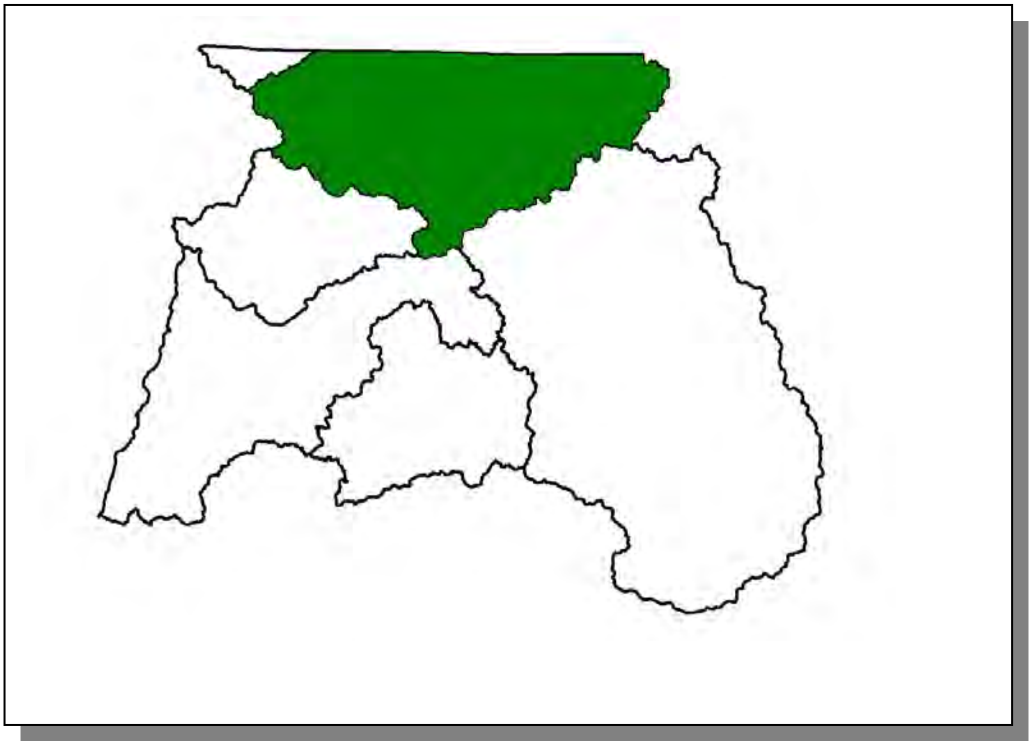

Figure 4-132. Location of Subwatershed 0513010404. *All South Fork Cumberland River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.3.D.i. 051301040401 (Big South Fork).

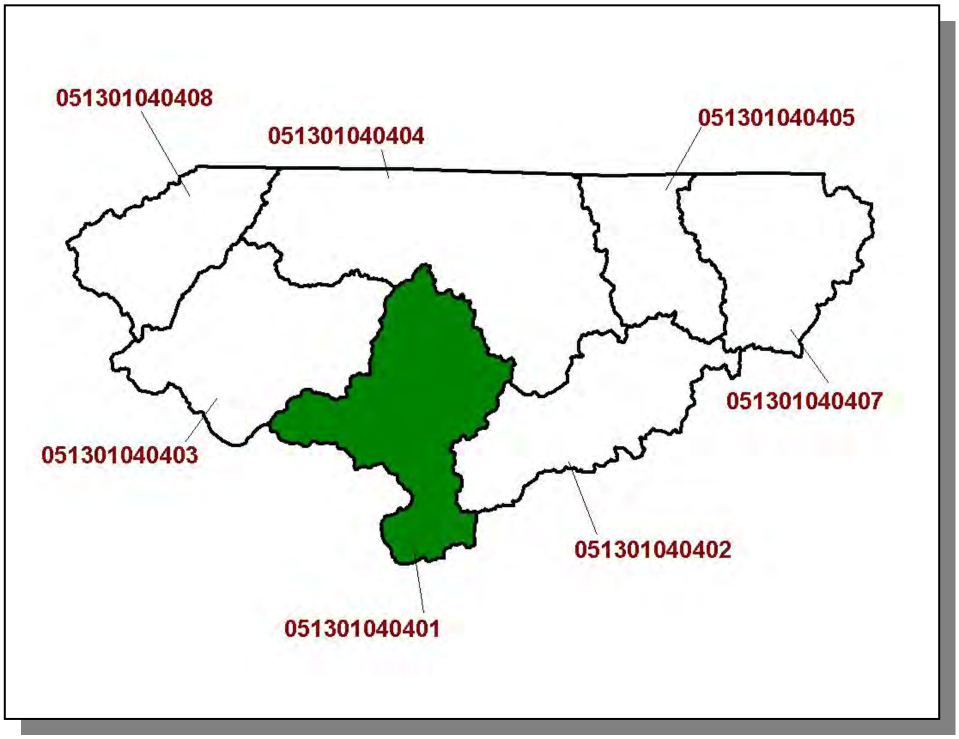

Figure 4-133. Location of Subwatershed 051301040401. *All South Fork Cumberland River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

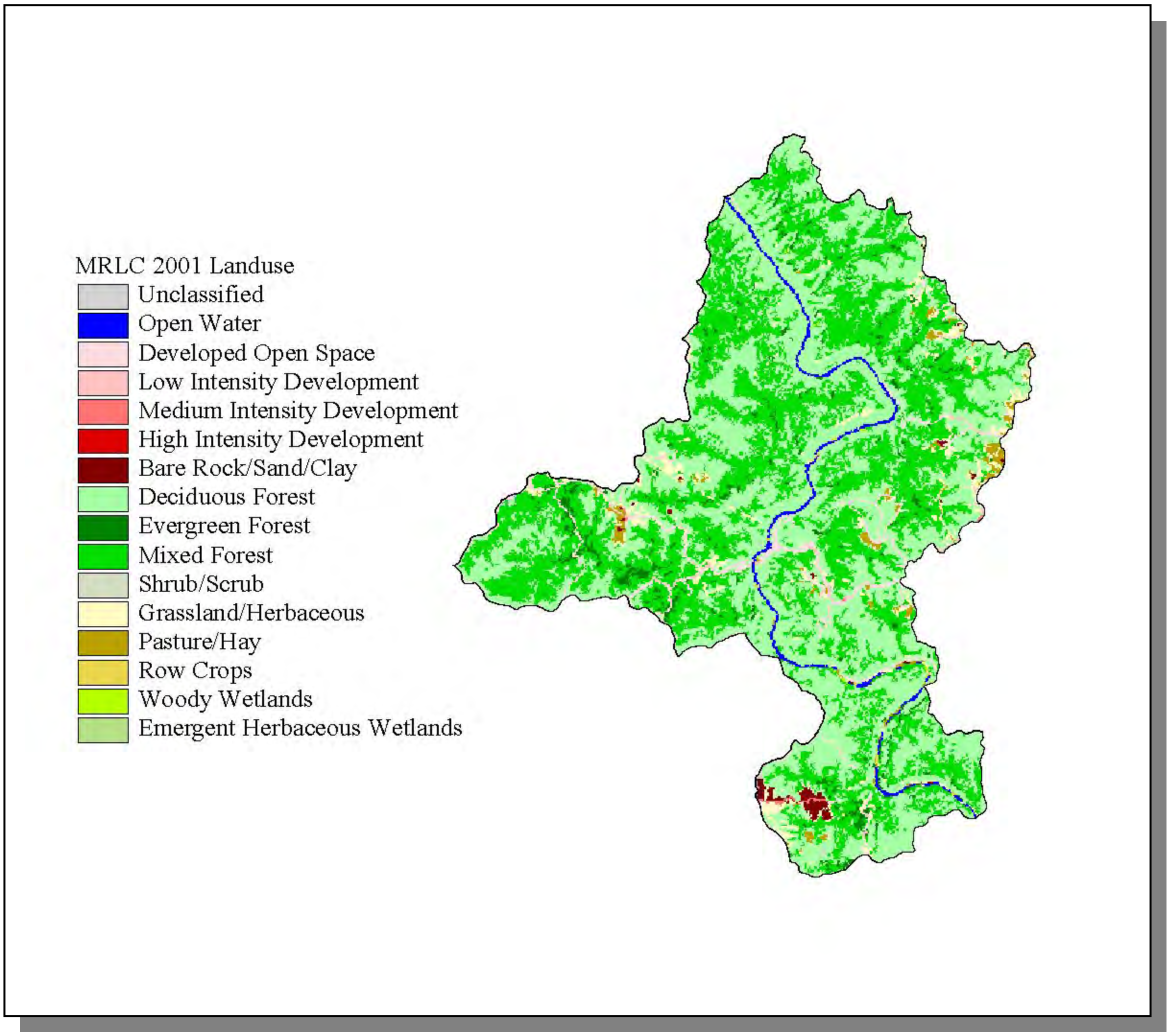

Figure 4-134. Illustration of Land Use Distribution in Subwatershed 051301040401.

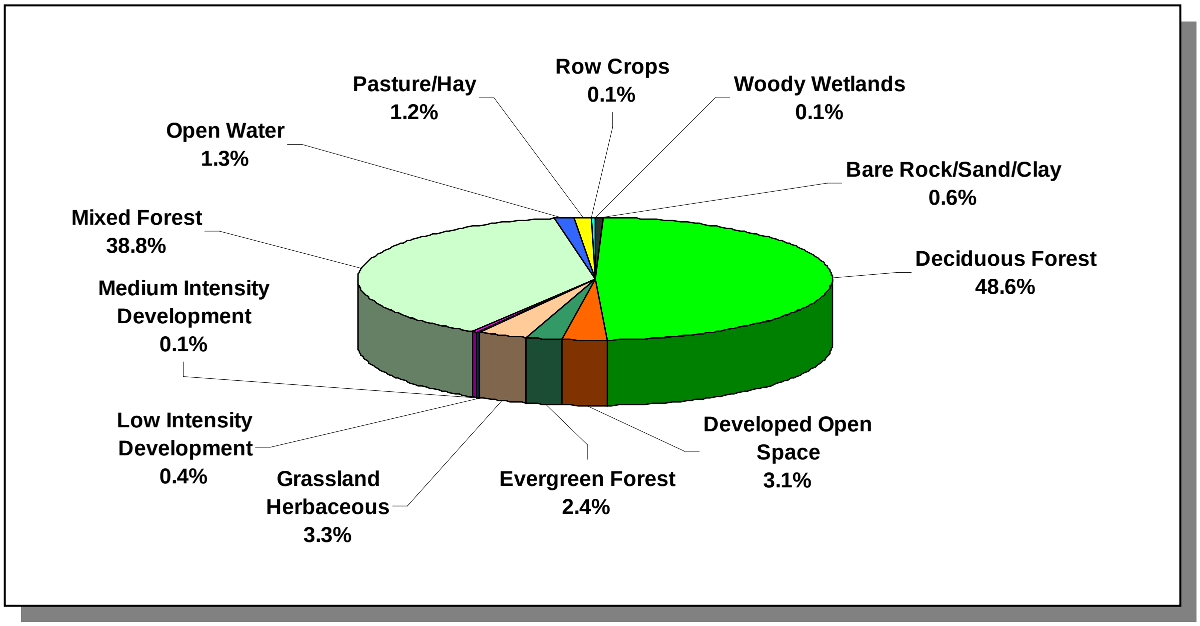

Figure 4-135. Land Use Distribution in Subwatershed 051301040401. *More information is provided in Appendix IV.*

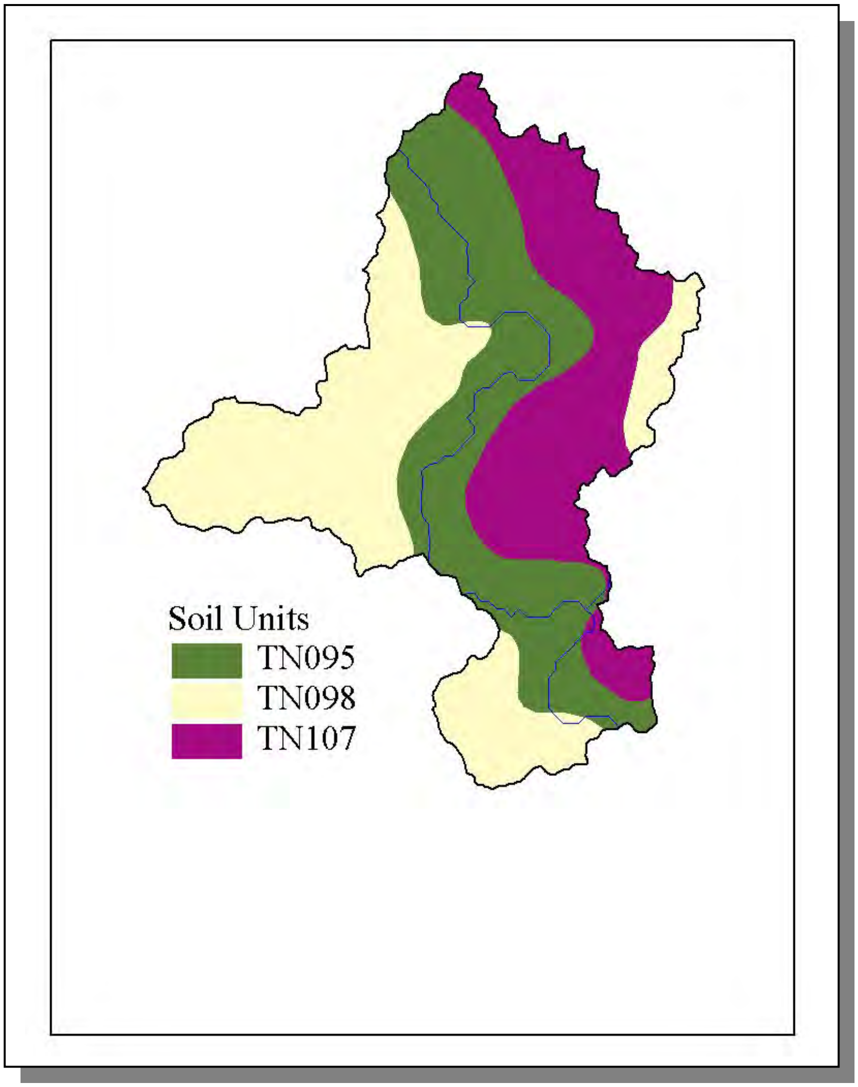

Figure 4-136. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040401.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN095	0.00	B	2.35	5.12	Loam	0.31
TN098	1.00	C	3.98	4.82	Loam	0.32
TN107	1.00	C	6.34	4.84	Loam	0.28

Table 4-106. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040401. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Fentress	14,669	15,920	16,625	0.45	66	72	75	13.6
Scott	18,358	19,816	21,127	5.56	1,020	1,101	1,174	15.1
Total	**33,027**	**35,736**	**37,752**		**1,086**	**1,173**	**1,249**	**15.0**

Table 4-107. Population Estimates in Subwatershed 051301040401.

Figure 4-137. Location of Historical Streamflow Data Collection Sites in Subwatershed 051301040401. *More information is provided in Appendix IV.*

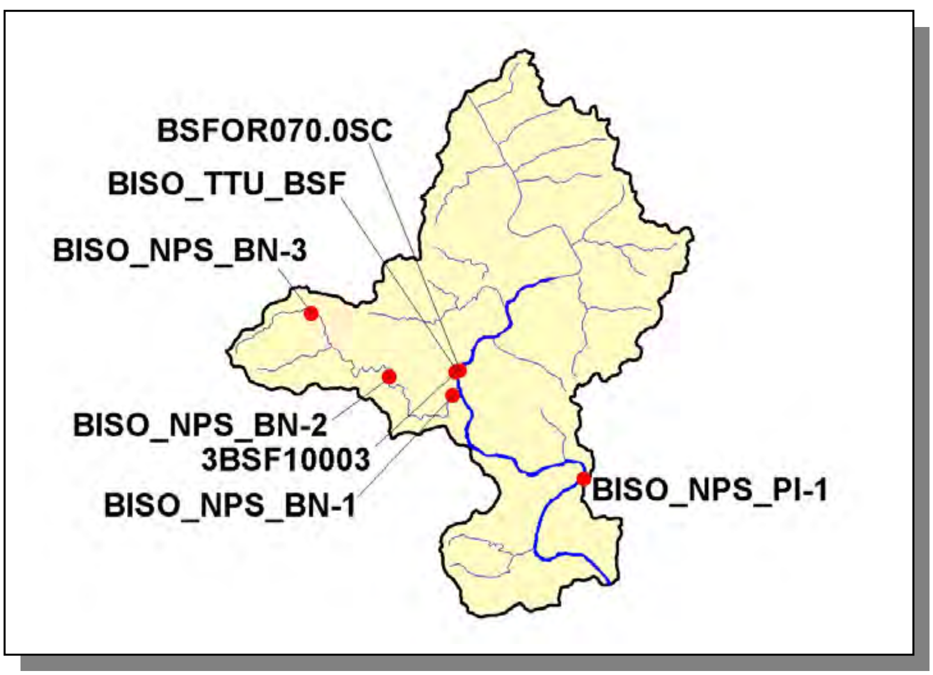

Figure 4-138. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301040401. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.D.i.a. Point Source Contributions.

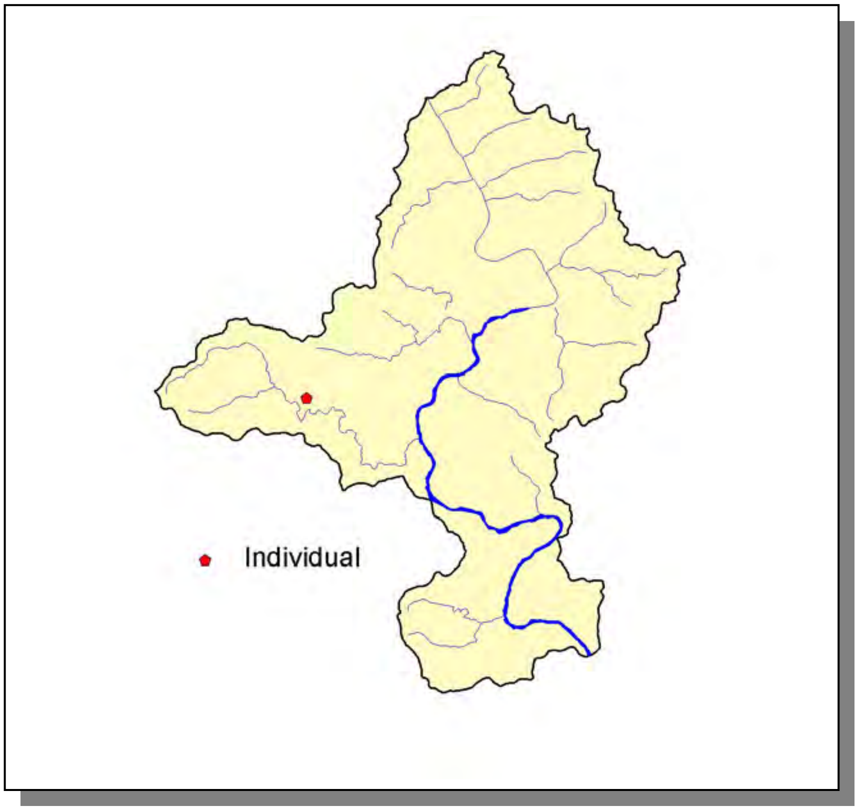

Figure 4-139. Location of Permits Issued in Subwatershed 051301040401. *More information, including the names of facilities, is provided in Appendix IV.*

Figure 4-140. Location of Active NPDES Sites in Subwatershed 051301040401. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.D.i.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS				
Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Sheep
45	93	<5	41,516	<5

Table 4-108. Summary of Livestock Count Estimates in Subwatershed 051301040401. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Chickens (Layers)	Hogs	Sheep
Fenteess	8,058	17,259	430	7,290,026	474	729	79
Scott	2,177	4,447	216	1,989,506	196	17	74

Table 4-109. Summary of Livestock Count Estimates in Fentress and Scott Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Fentress	244.1	244.1	3.6	14.3
Scott	300.3	300.3	5.5	21.4

Table 4-110. Forest Acreage and Annual Removal Rates (1987-1994) in Fentress and Scott Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.35
Legumes, Grass (Hayland)	0.56
Grass, Forbs, Legumes (Mixed Pasture)	0.56
Corn (Row Crops)	16.18
Soybeans (Row Crops)	6.00
Wheat (Close-Grown Cropland)	43.40
Other Vegetable and Truck Crops	15.94
Farmsteads and Ranch Headquarters	0.11

Table 4-111. Annual Estimated Total Soil Loss in Subwatershed 0604000401.

4.3.D.ii. 051301040402 (Pine Creek).

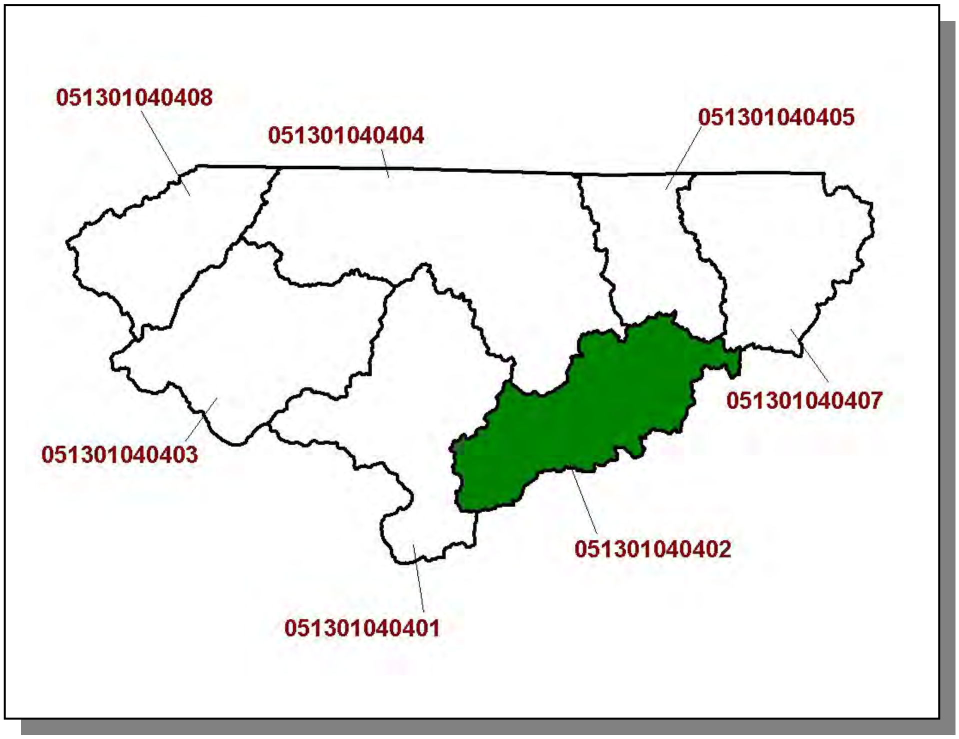

Figure 4-141. Location of Subwatershed 051301040402. *All South Fork Cumberland River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

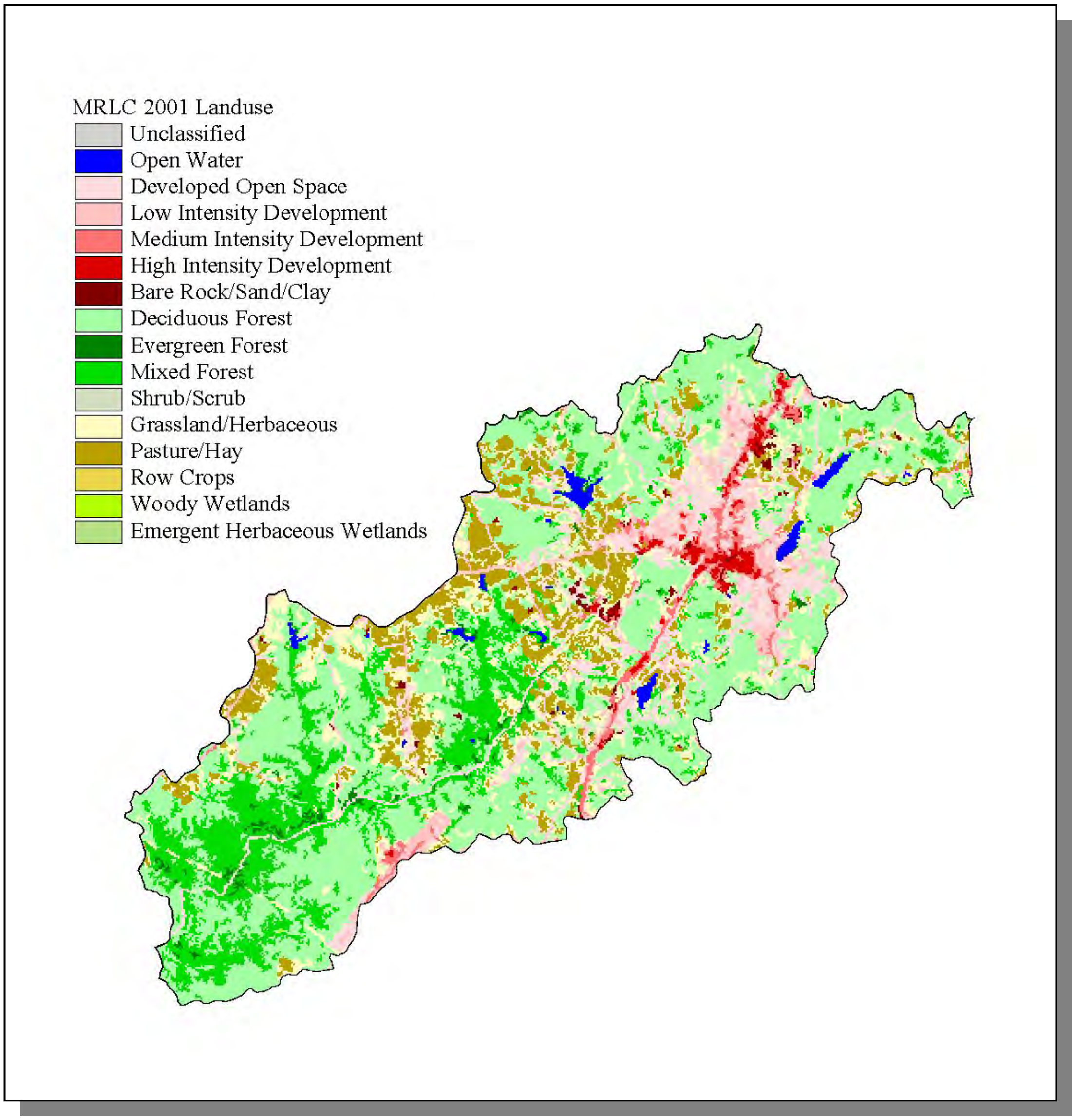

Figure 4-142. Illustration of Land Use Distribution in Subwatershed 051301040402.

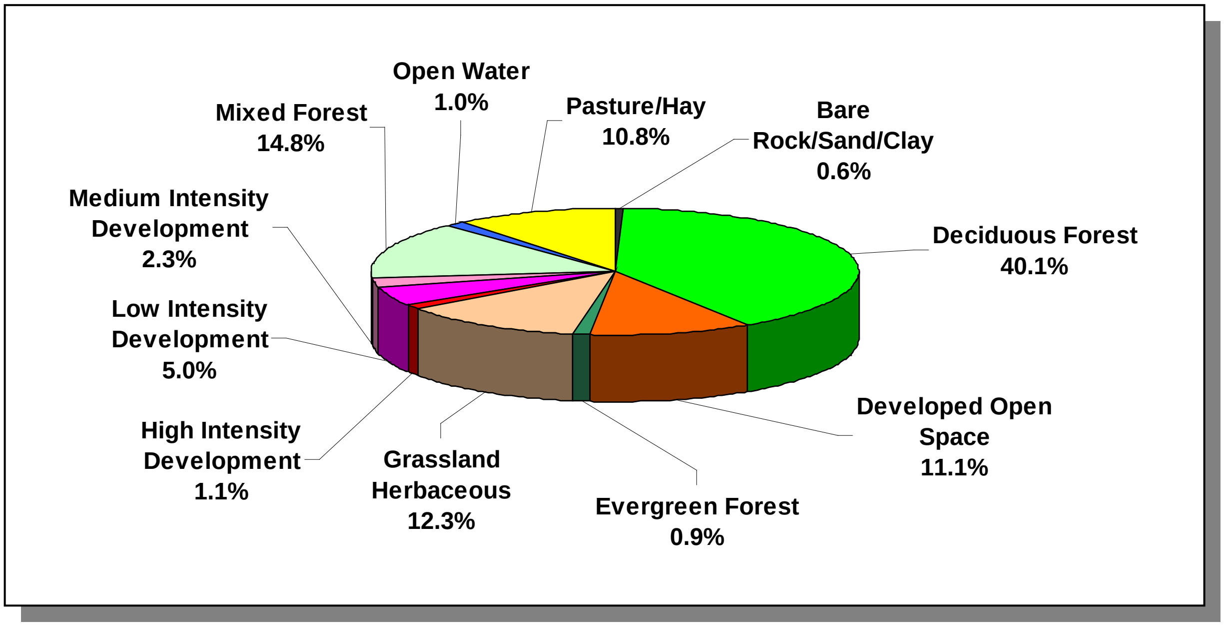

Figure 4-143. Land Use Distribution in Subwatershed 051301040402. *More information is provided in Appendix IV.*

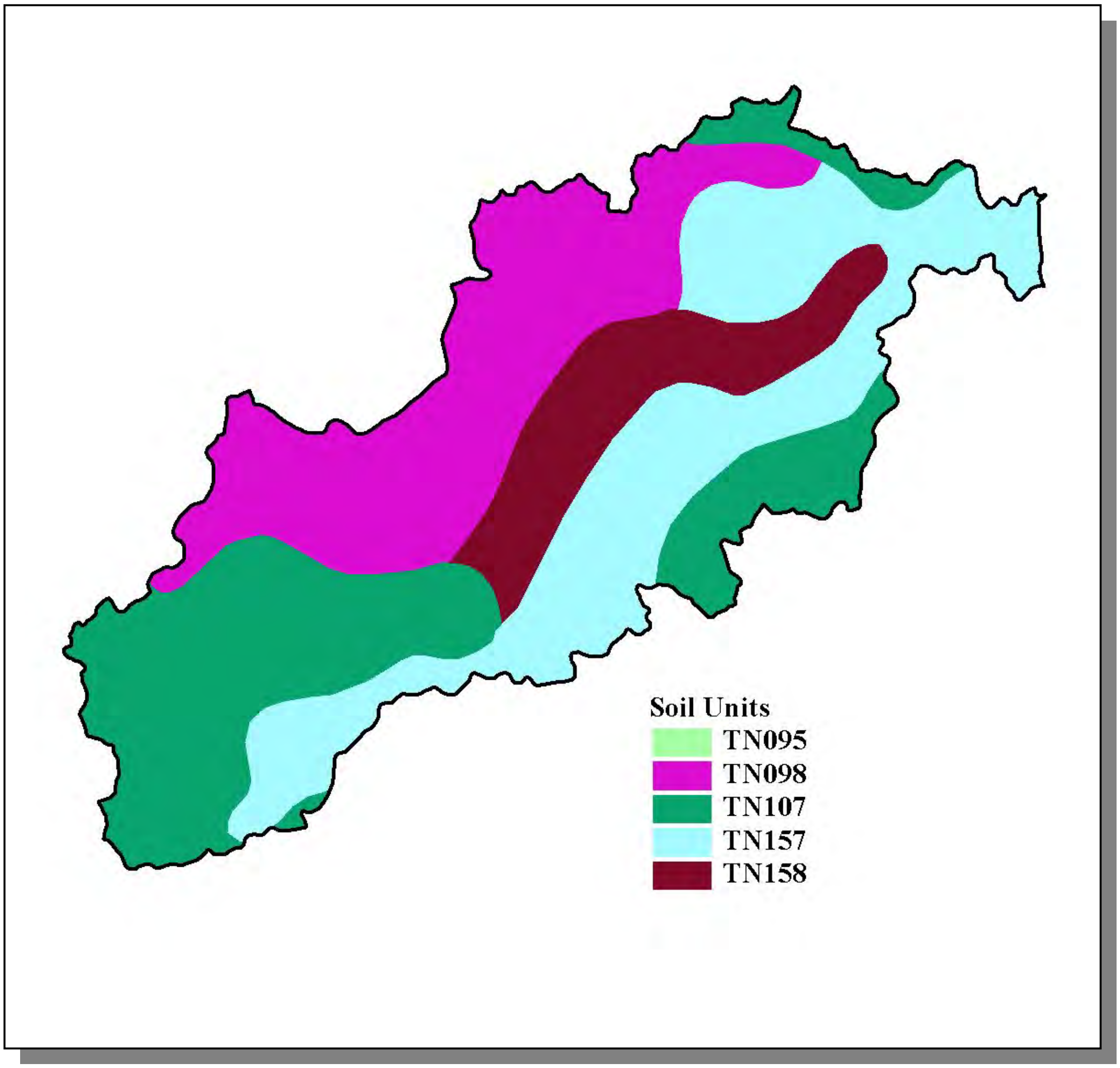

Figure 4-144. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040402.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN095	0.00	B	2.35	5.12	Loam	0.31
TN098	5.00	C	3.98	4.82	Loam	0.32
TN100	0.00	B	1.14	3.35	Silty Loam	0.21
TN107	5.00	C	6.34	4.84	Loam	0.28
TN157	0.00	B	2.38	4.62	Loam	0.28

Table 4-112. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040402. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Scott	18,358	19,816	21,127	4.97	912	985	1,050	15.1

Table 4-113. Population Estimates in Subwatershed 051301040402

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Oneida	Scott	3,502	1,506	1,098	393	15

Table 4-114. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051301040402.

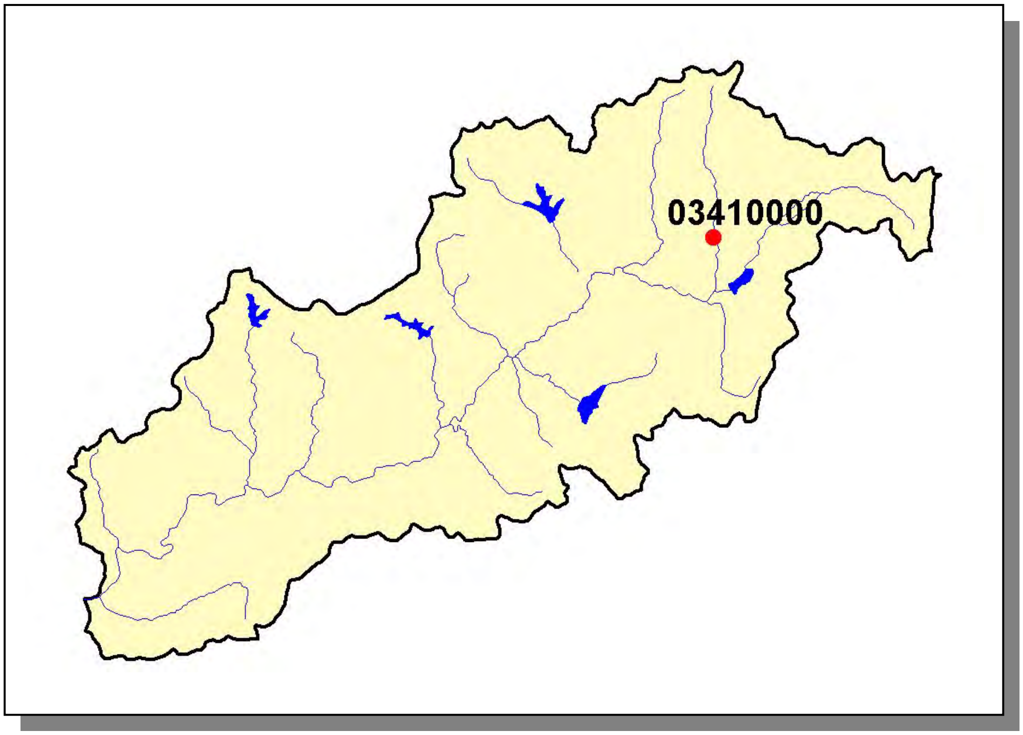

Figure 4-145. Location of Historical Streamflow Data Collection Sites in Subwatershed 051301040402. *More information is provided in Appendix IV.*

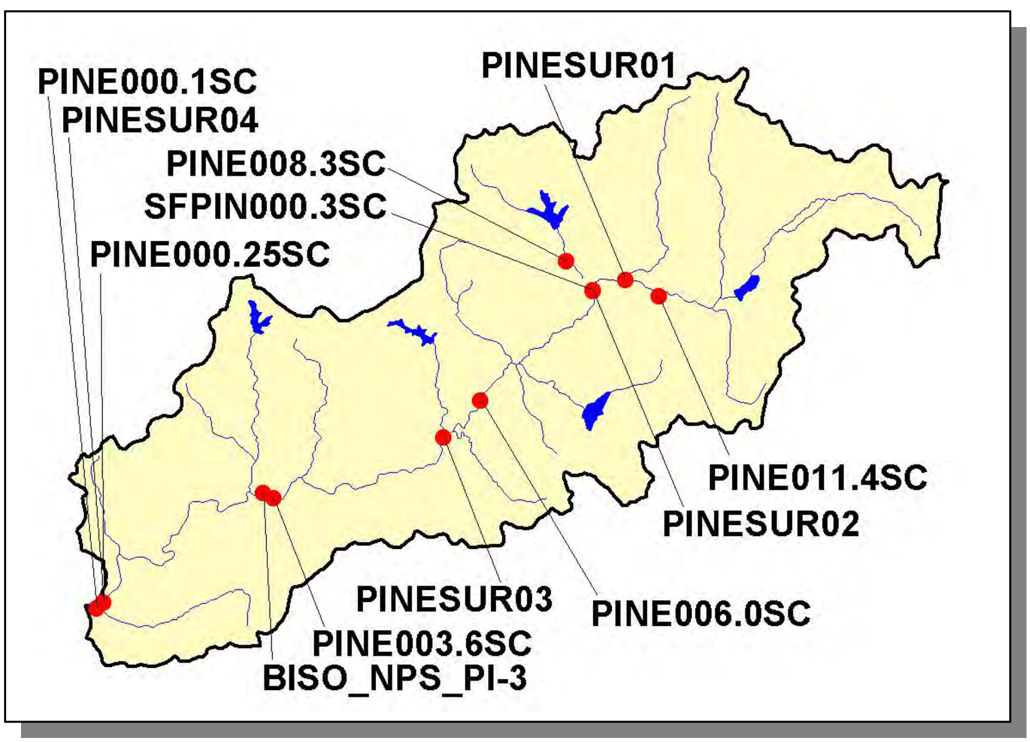

Figure 4-146. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301040402. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.D.ii.a. Point Source Contributions.

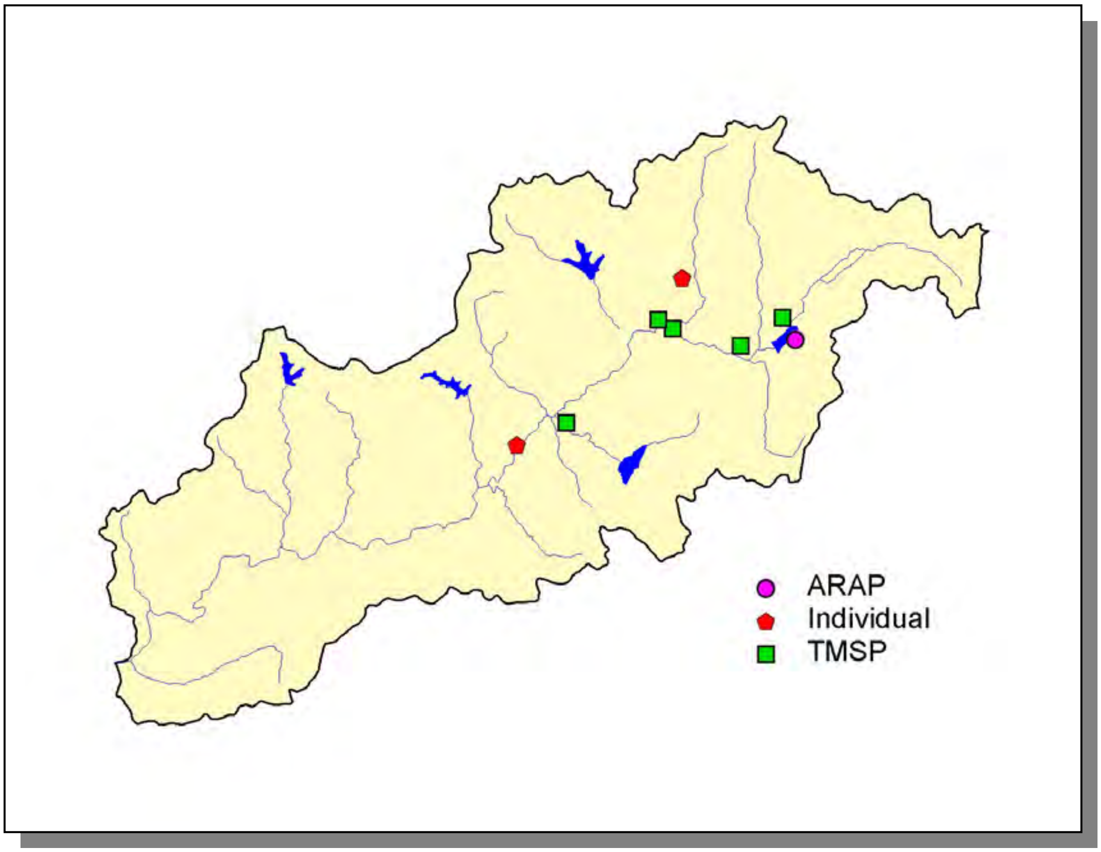

Figure 4-147. Location of Permits Issued in Subwatershed 051301040402. *More information, including the names of facilities, is provided in Appendix IV.*

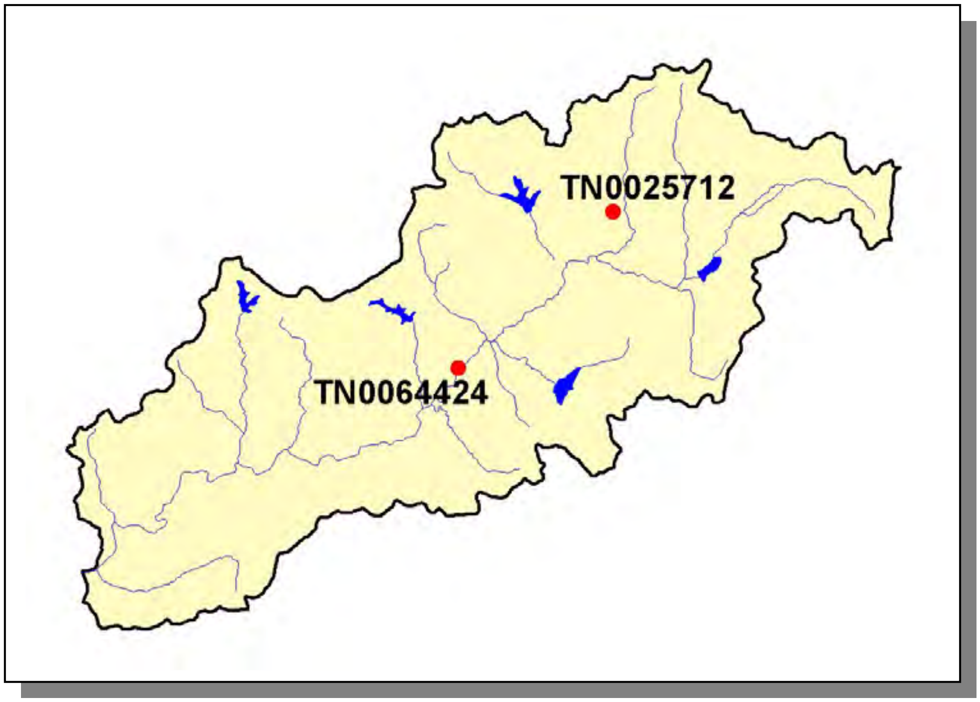

Figure 4-148. Location of Active NPDES Sites in Subwatershed 051301040402. *More information, including the names of facilities, is provided in Appendix IV.*

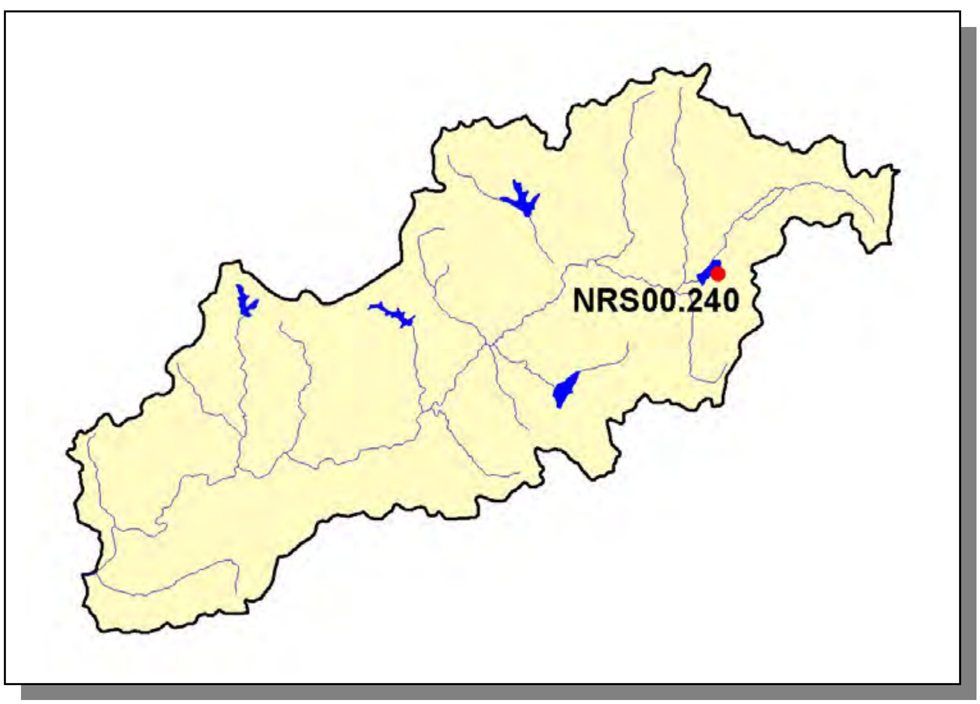

Figure 4-149. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 051301040402. *More information is provided in Appendix IV.*

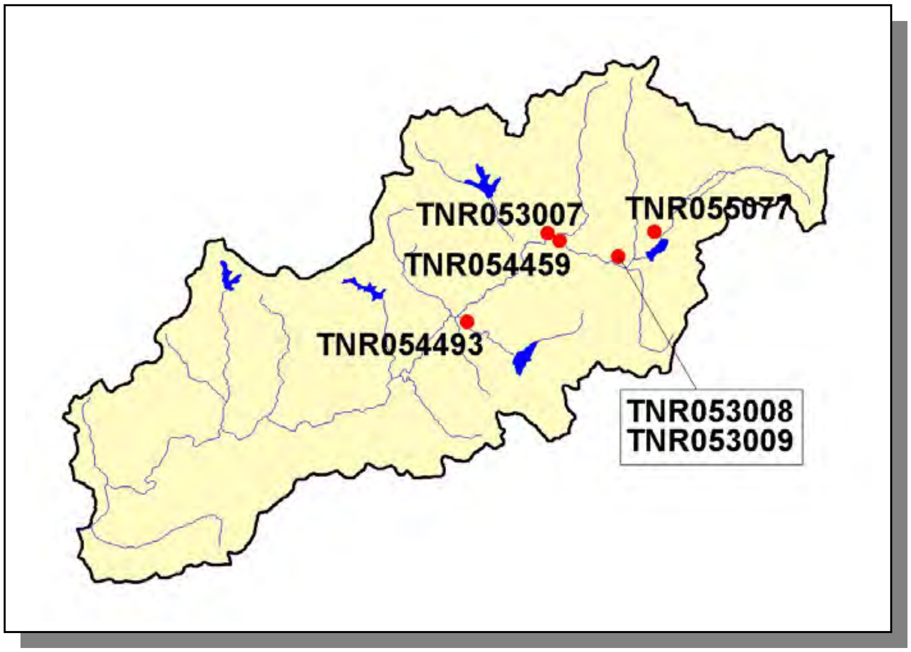

Figure 4-150. Location of TMSP Sites in Subwatershed 051301040402. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.D.ii.a.i. Dischargers to Water Bodies Listed on the 2004 303(d) List

There are two NPDES facilities discharging to water bodies listed on the 2004 303(d) list in Subwatershed 051301040402:

- TN0025712 (HBD Industries) discharges to Litton Fork Pine Creek @ RM 0.1
- TN0064424 (Oneida STP) discharges to Pine Creek @ RM 7.2

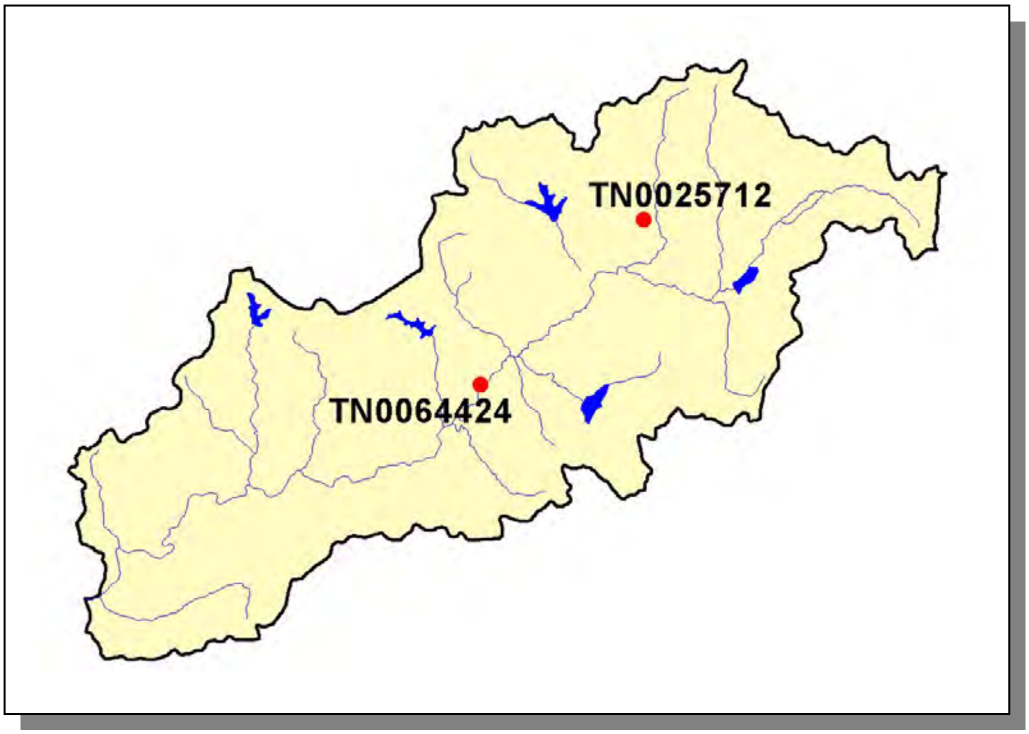

Figure 4-151. Location of NPDES Dischargers to Water Bodies Listed on the 2004 303(d) List in Subwatershed 051301040402. *More information, including the names of facilities, is provided in Appendix IV.*

Permit #	3Q2	1Q10	3Q10	3Q20	7Q10
TN0025712	0.00	na	0.00	0.00	0.00
TN0064424	0.15	na	0.04	0.03	0.05

Table 4-115. Receiving Stream Low Flow Information for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051301040402. *Data are in cubic feet per second (CFS). Data were obtained from the USGS web application StreamStats at http://water.usgs.gov/osw/streamstats/. (na, data not available)*

PERMIT #	NO_3	Zn	Hg	Cu	Pb	Ni	Cd	Mo	As	Se	FLOW	TEMPERATURE
TN0025712											X	X
TN0064424	X	X	X	X	X	X	X	X	X	X		

Table 4-116. Monitoring Requirements for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051301040402.

PERMIT #	WET	$CBOD_5$	NH_3	TRC	TSS	SETTLEABLE SOLIDS	DO	pH	CN	P	OIL and GREASE
TN0025712					X			X			X
TN0064424	X	X	X	X	X	X	X	X	X	X	

Table 4-117. Parameters Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051301040402*. WET, Whole Effluent Toxicity; $CBOD_5$, Carbonaceous Biochemical Oxygen Demand (5-Day); TRC, Total Residual Chlorine; TSS, Total Suspended Solids.*

PERMIT #	*E. coli*	FECAL COLIFORM
TN0064424	X	X

Table 4-118. Bacteria Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051301040402*.*

4.2.D.ii.b. Nonpoint Source Contributions.

There are no known nonpoint source contributions in this subwatershed.

4.3.D.iii. 051301040403 (Station Camp Creek).

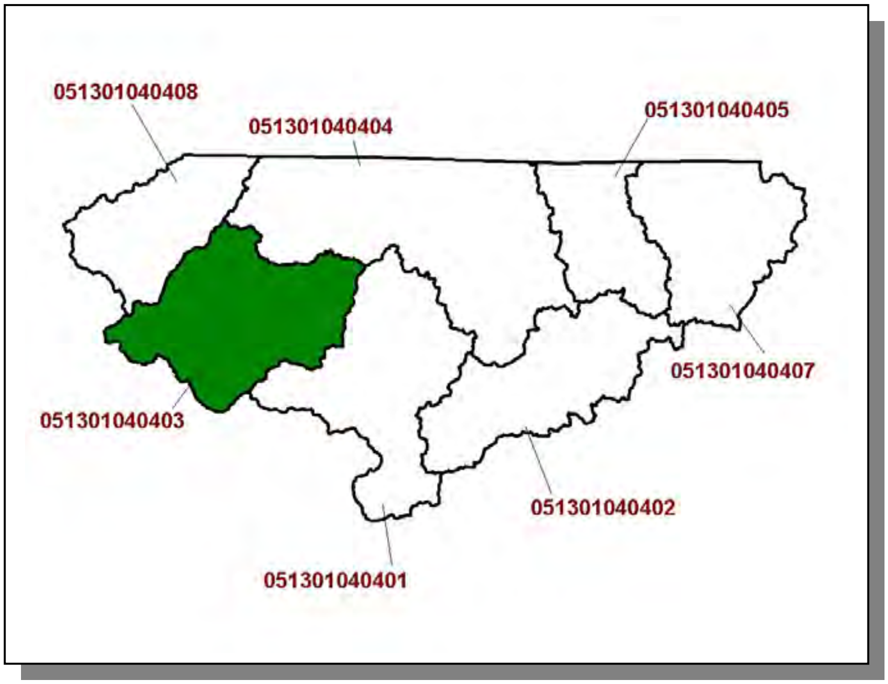

Figure 4-152. Location of Subwatershed 051301040403. *All South Fork Cumberland River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

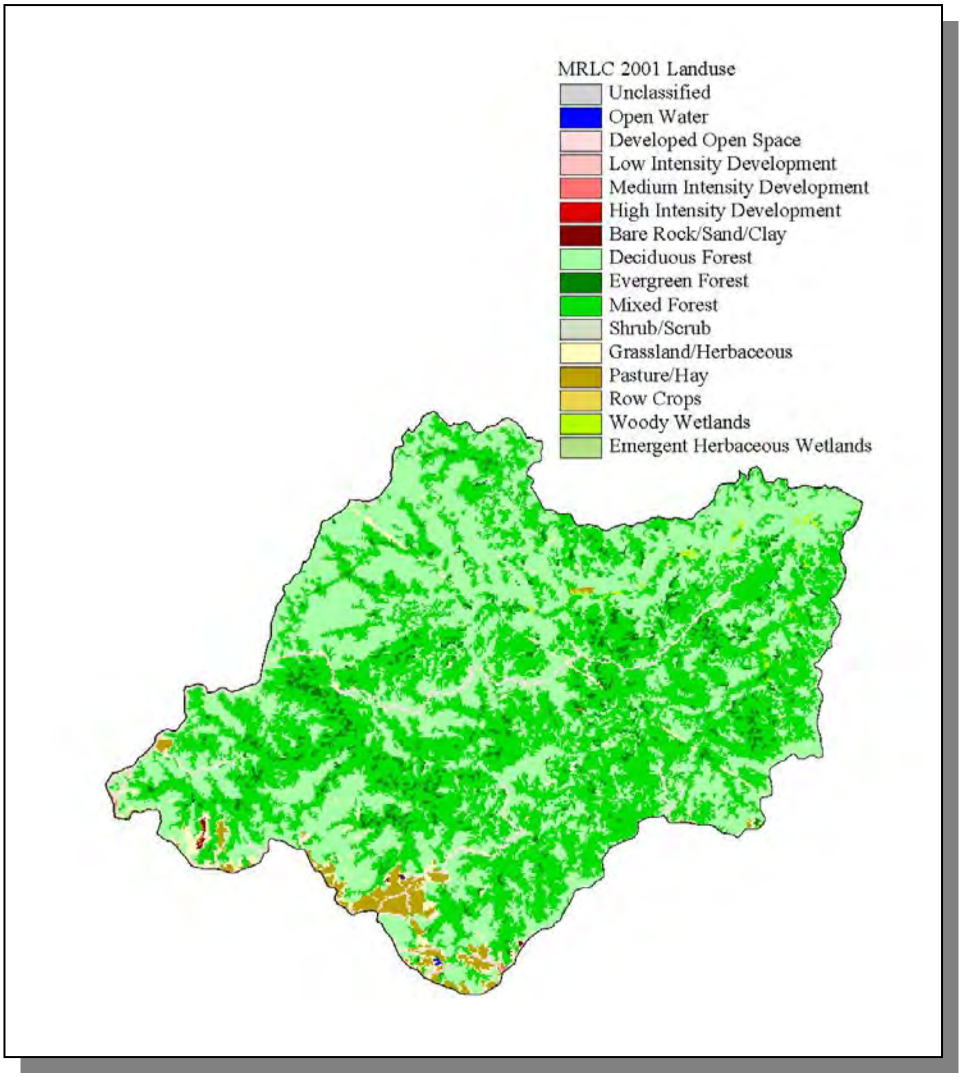

Figure 4-153. Illustration of Land Use Distribution in Subwatershed 051301040403.

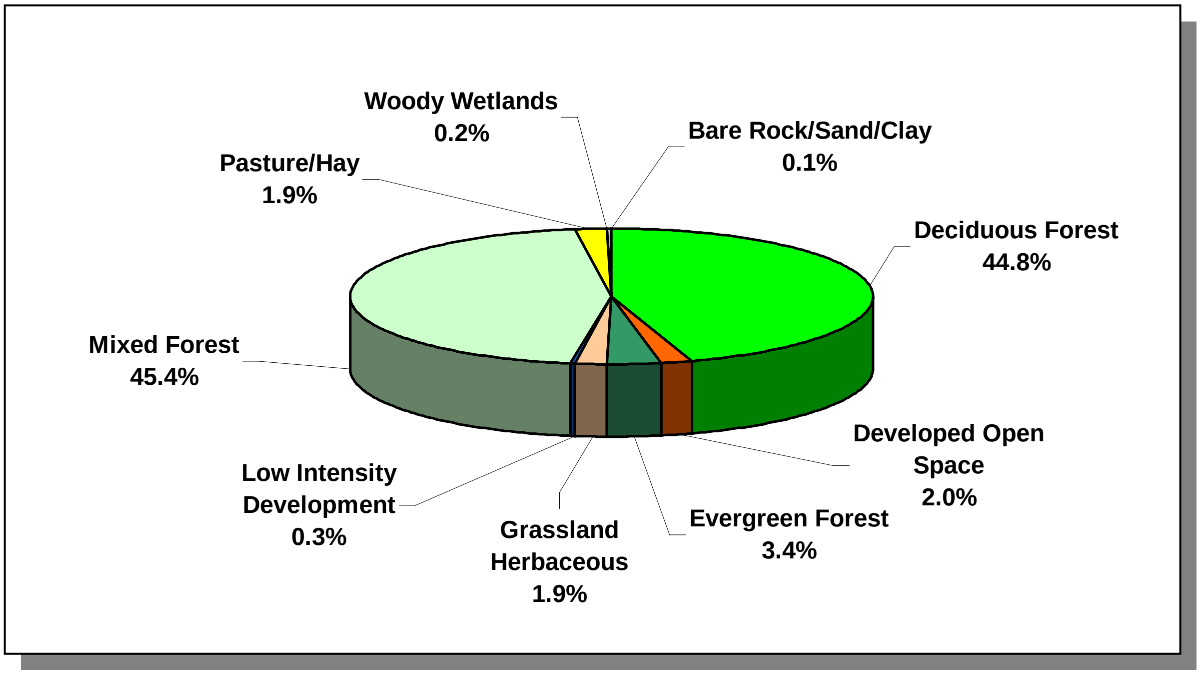

Figure 4-154. Land Use Distribution in Subwatershed 051301040403. *More information is provided in Appendix IV.*

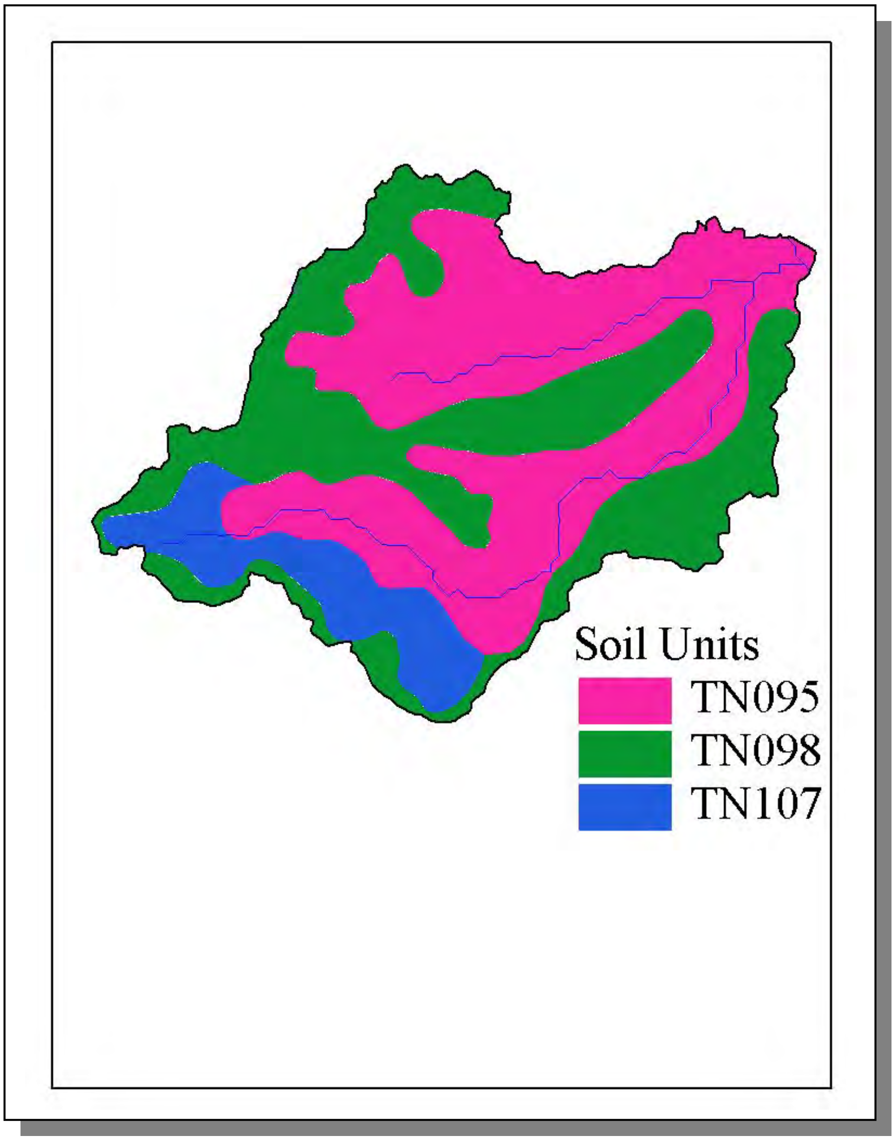

Figure 4-155. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040403.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN095	0.00	B	2.35	5.12	Loam	0.31
TN098	1.00	C	3.98	4.82	Loam	0.32
TN107	1.00	C	6.34	4.84	Loam	0.28

Table 4-119. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040403. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Fentress	14,669	15,920	16,625	3.1	455	494	516	13.4
Pickett	4,548	4,631	4,945	2.8	127	130	138	8.7
Scott	18,358	19,816	21,127	2.11	387	418	446	15.2
Total	**37,575**	**40,367**	**42,697**		**969**	**1,042**	**1,100**	**13.5**

Table 4-120. Population Estimates in Subwatershed 051301040403.

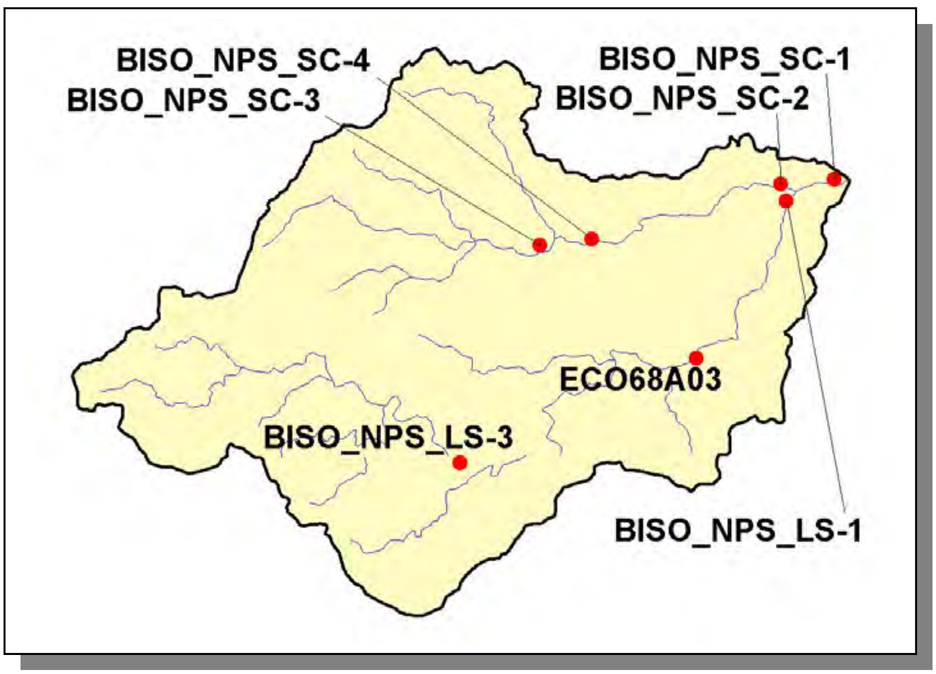

Figure 4-156. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301040403. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.D.iii.a. Point Source Contributions.

There are no point source contributions in this subwatershed.

4.2.D.iii.b. Nonpoint Source Contributions.

LIVESTOCK COUNTSS					
Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Hogs	Sheep
84	180	5	76,233	7	<5

Table 4-121. Summary of Livestock Count Estimates in Subwatershed 051301040403. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* **"***Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Chickens (Layers)	Hogs	Sheep
Fentress	8,058	17,259	430	7,290,026	474	729	79
Pickett	5,986	10,864	19		285	99	
Scott	2,177	4,447	216	1,989,506	196	17	74

Table 4-122. Summary of Livestock Count Estimates in Fentress, Pickett, and Scott Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* **"***Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Fentress	244.1	244.1	3.6	14.3
Pickett	68.4	68.4	0.2	0.6
Scott	300.3	300.3	5.5	21.4

Table 4-123. Forest Acreage and Annual Removal Rates (1987-1994) in Fentress, Pickett, and Scott Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.64
Grass (Hayland)	0.11
Legumes, Grass (Hayland)	0.44
Grass, Forbs, Legumes (Mixed Pasture)	0.45
Corn (Row Crops)	16.18
Soybeans (Row Crops)	6.00
Tobacco (Row Crops)	23.18
Wheat (Close-Grown Cropland)	43.40
Other Vegetable and Truck Crops	15.94
Farmsteads and Ranch Headquarters	1.43

Table 4-124. Annual Estimated Total Soil Loss in Subwatershed 051301040403.

4.3.D.iv. 051301040404 (Big South Fork).

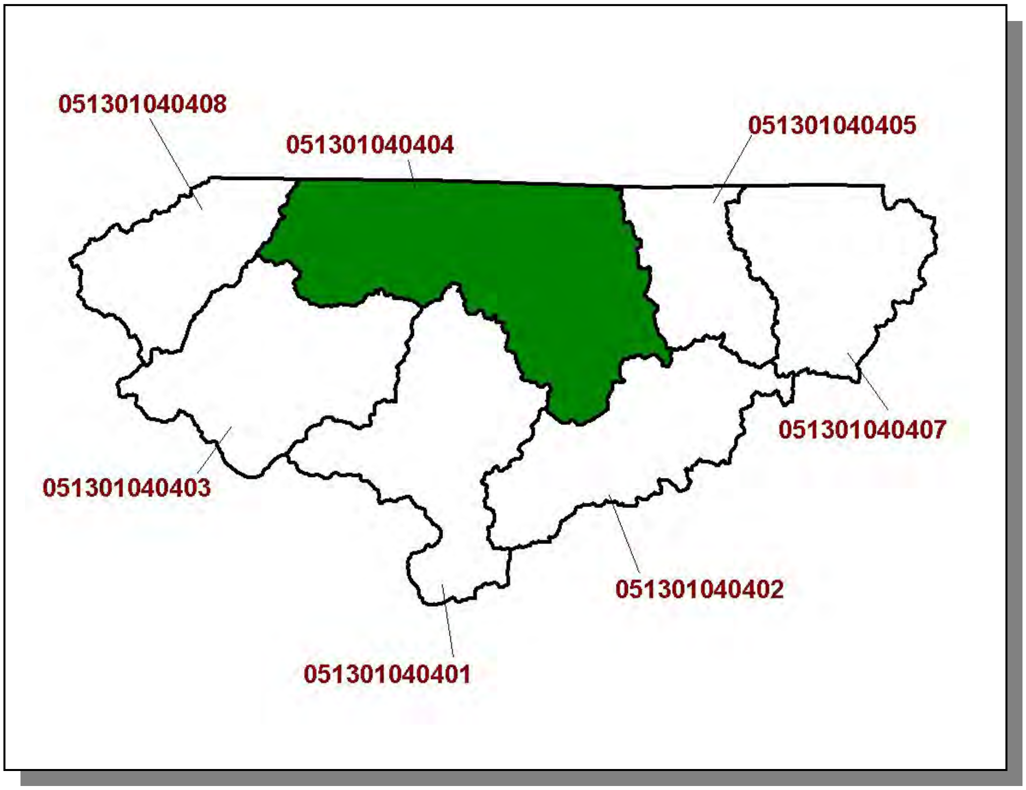

Figure 4-157. Location of Subwatershed 051301040404. *All South Fork Cumberland River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

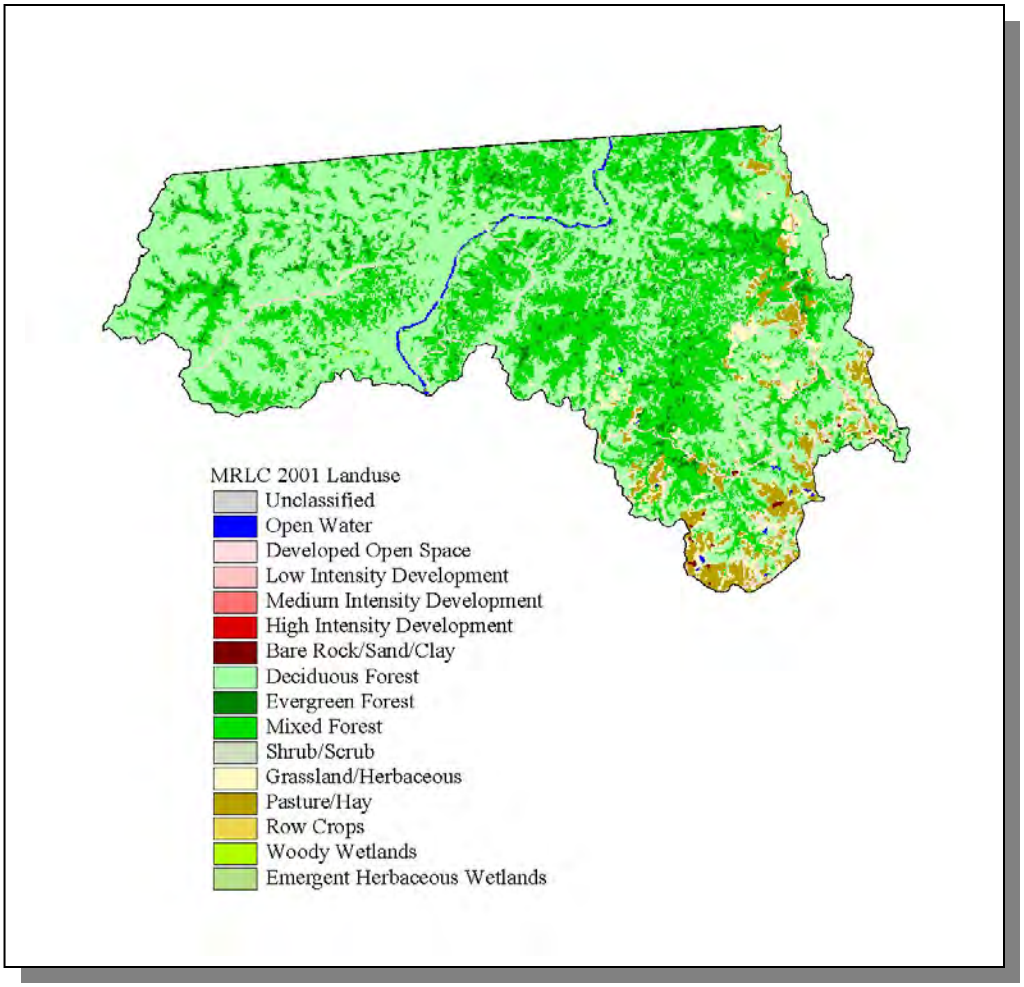

Figure 4-158. Illustration of Land Use Distribution in Subwatershed 051301040404.

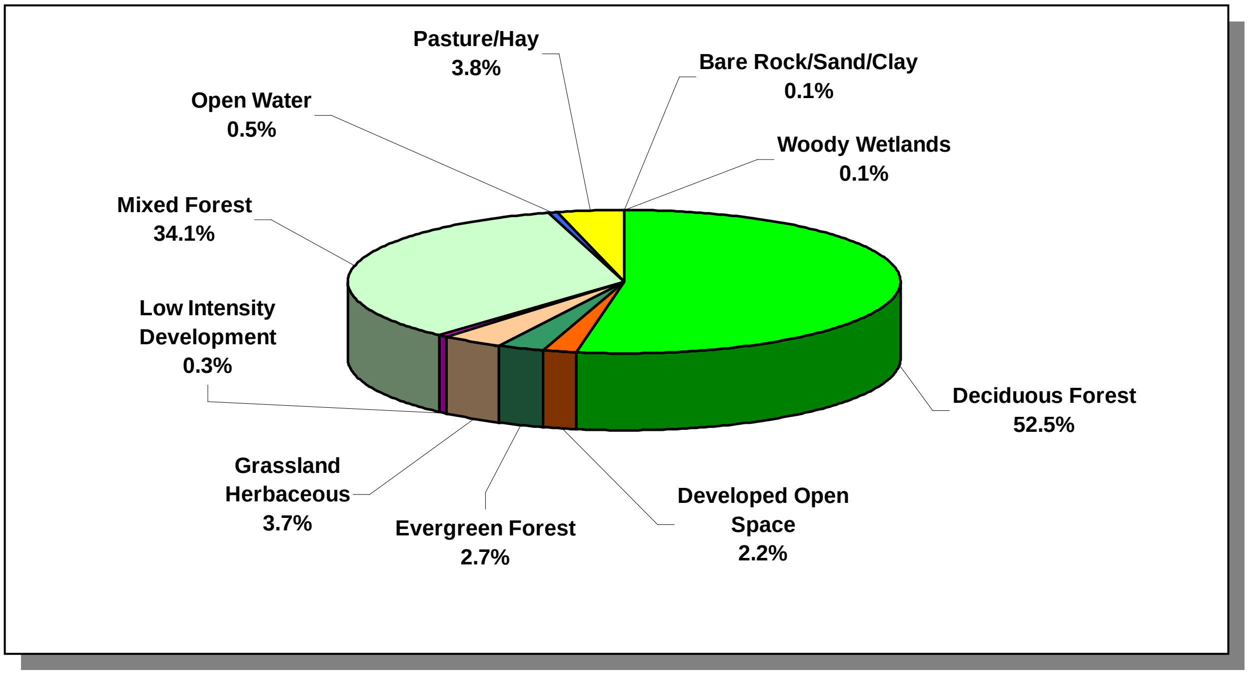

Figure 4-159. Land Use Distribution in Subwatershed 051301040404. *More information is provided in Appendix IV.*

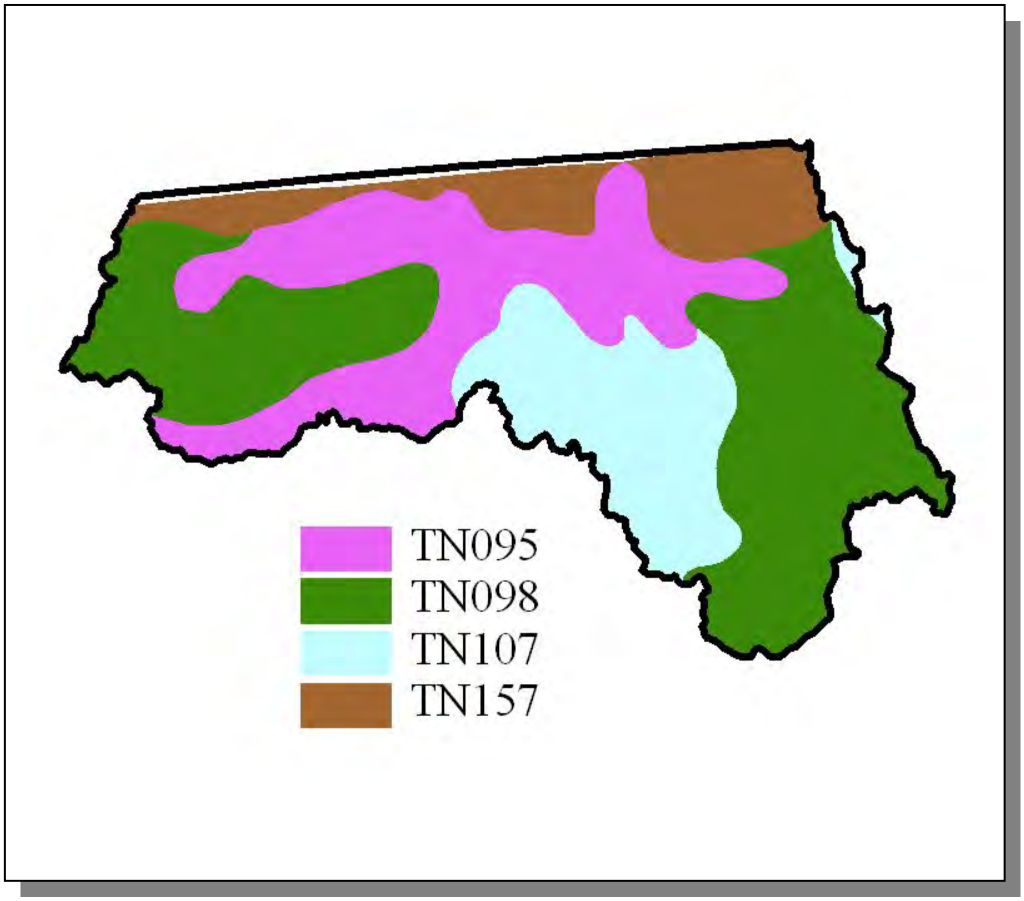

Figure 4-160. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040404.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN095	0.00	B	2.35	5.12	Loam	0.31
TN098	1.00	C	3.98	4.82	Loam	0.32
TN107	1.00	C	6.34	4.84	Loam	0.28
TN157	0.00	B	2.38	4.62	Loam	0.28

Table 4-125. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040404. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Scott	18,358	19,816	21,127	9.18	1,686	1,820	1,940	15.1

Table 4-126. Population Estimates in Subwatershed 051301040404.

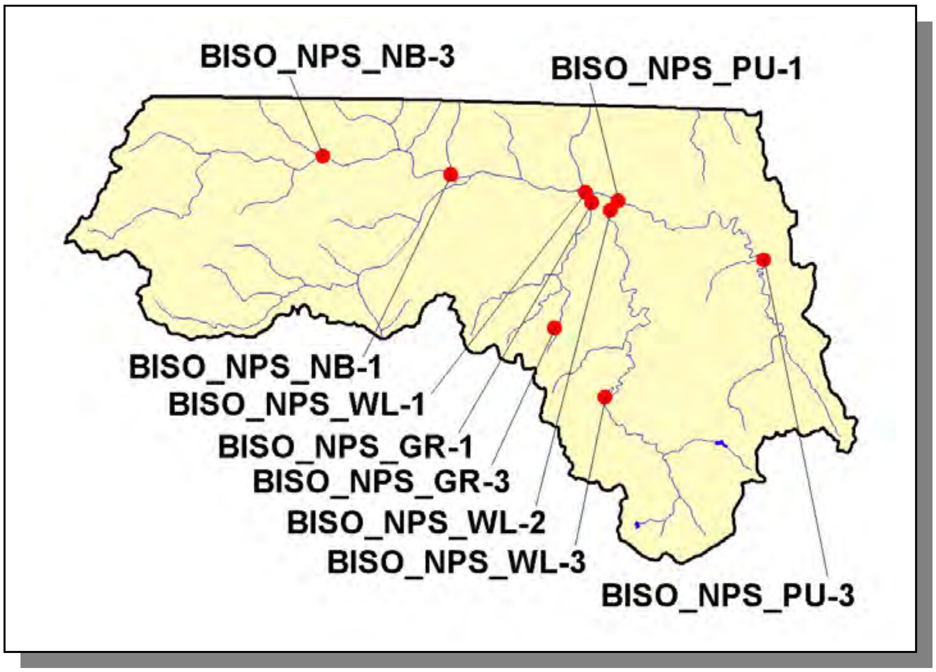

Figure 4-161. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301040404. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.D.iv.a. Point Source Contributions.

There are no point source contributions in this subwatershed.

4.2.D.iv.b. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
209	426	21	<5	190,549	<5	7

Table 4-127. Summary of Livestock Count Estimates in Subwatershed 051301040404. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Chickens (Layers)	Hogs	Sheep
Scott	2,177	4,447	216	1,989,506	196	17	74

Table 4-128. Summary of Livestock Count Estimates in Scott County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Scott	300.3	300.3	5.5	21.4

Table 4-129. Forest Acreage and Annual Removal Rates (1987-1994) in Scott County.

CROPS	TONS/ACRE/YEAR
Grass (Hayland)	0.33
Grass, Forbs, Legumes (Mixed Pasture)	0.58
Farmsteads and Ranch Headquarters	0.09

Table 4-130. Annual Estimated Total Soil Loss in Subwatershed 0604000401.

4.3.D.v. 051301040405 (Bear Creek).

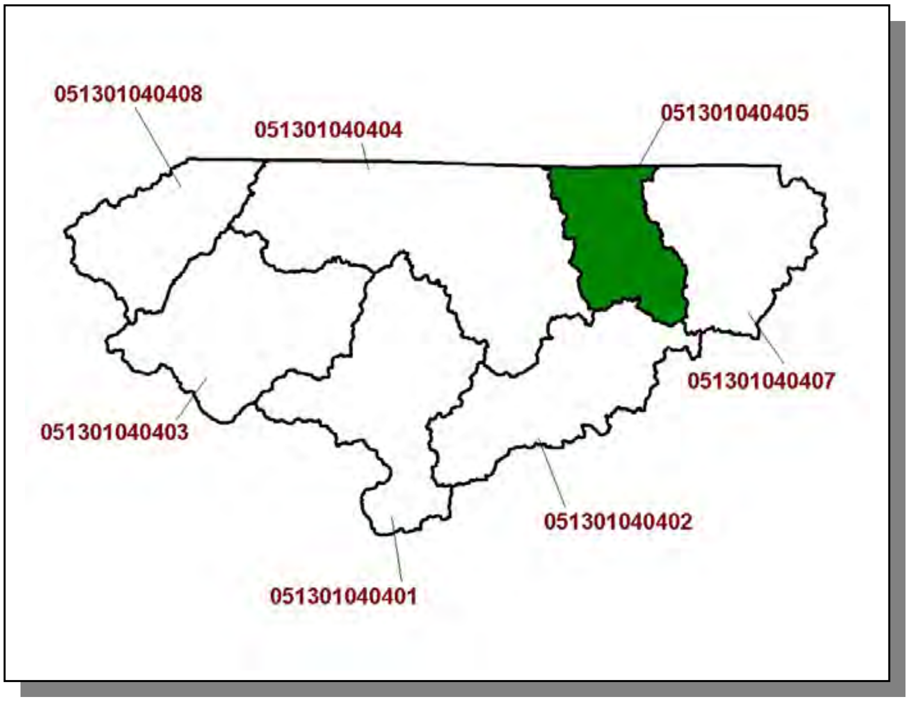

Figure 4-162. Location of Subwatershed 051301040405. *All South Fork Cumberland River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

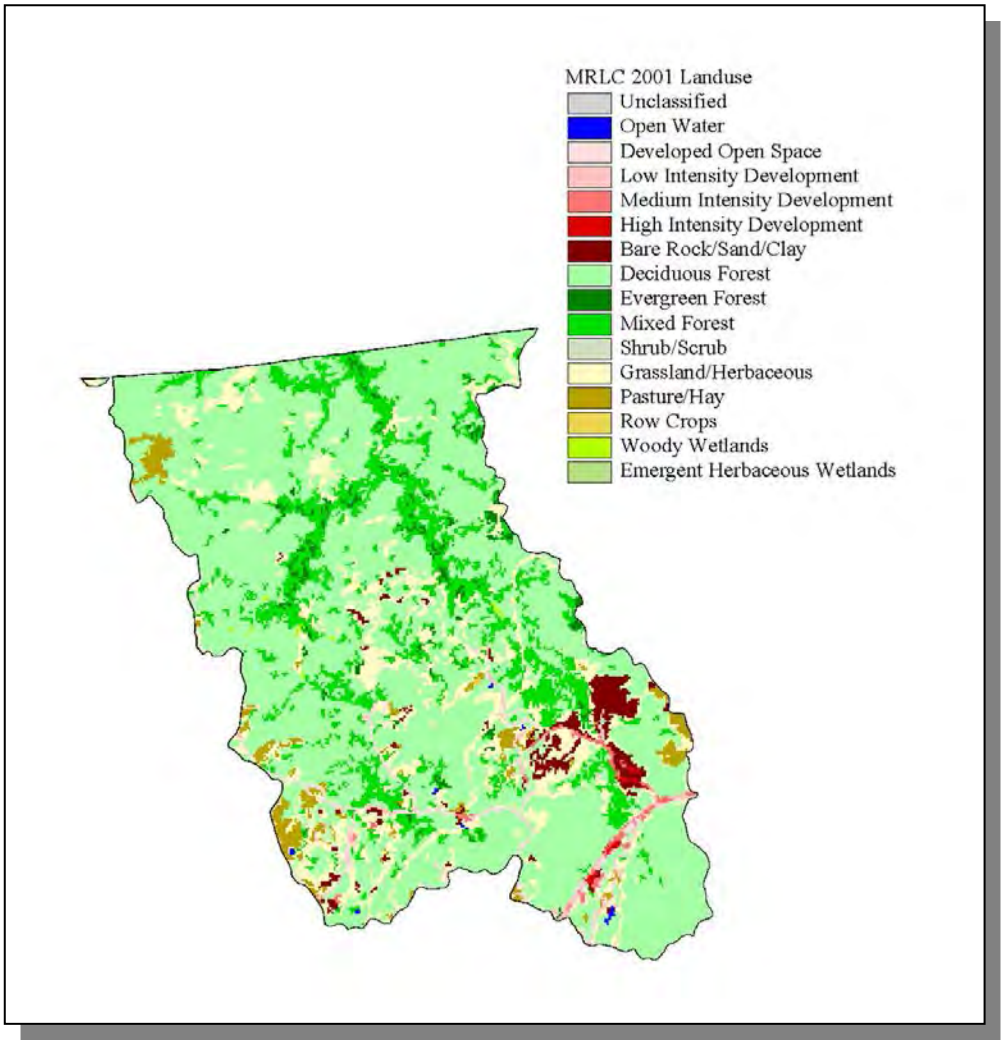

Figure 4-163. Illustration of Land Use Distribution in Subwatershed 051301040405.

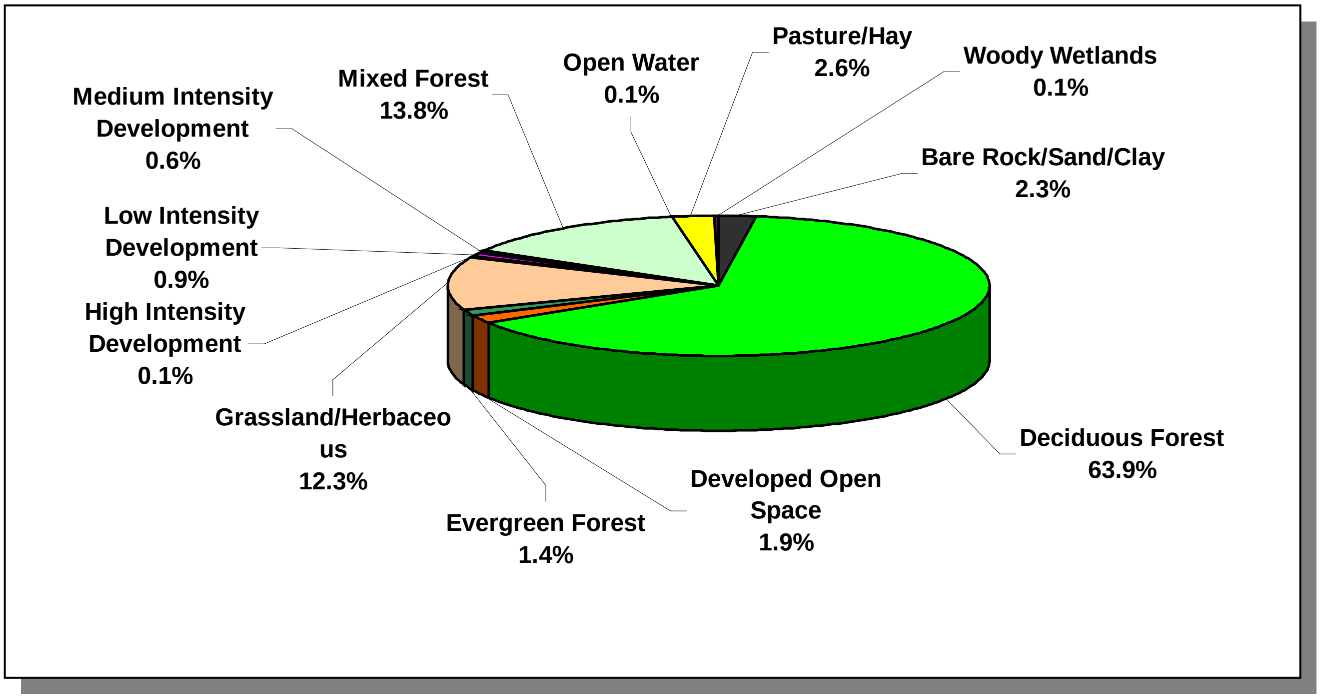

Figure 4-164. Land Use Distribution in Subwatershed 051301040405. More information is provided in Appendix IV.

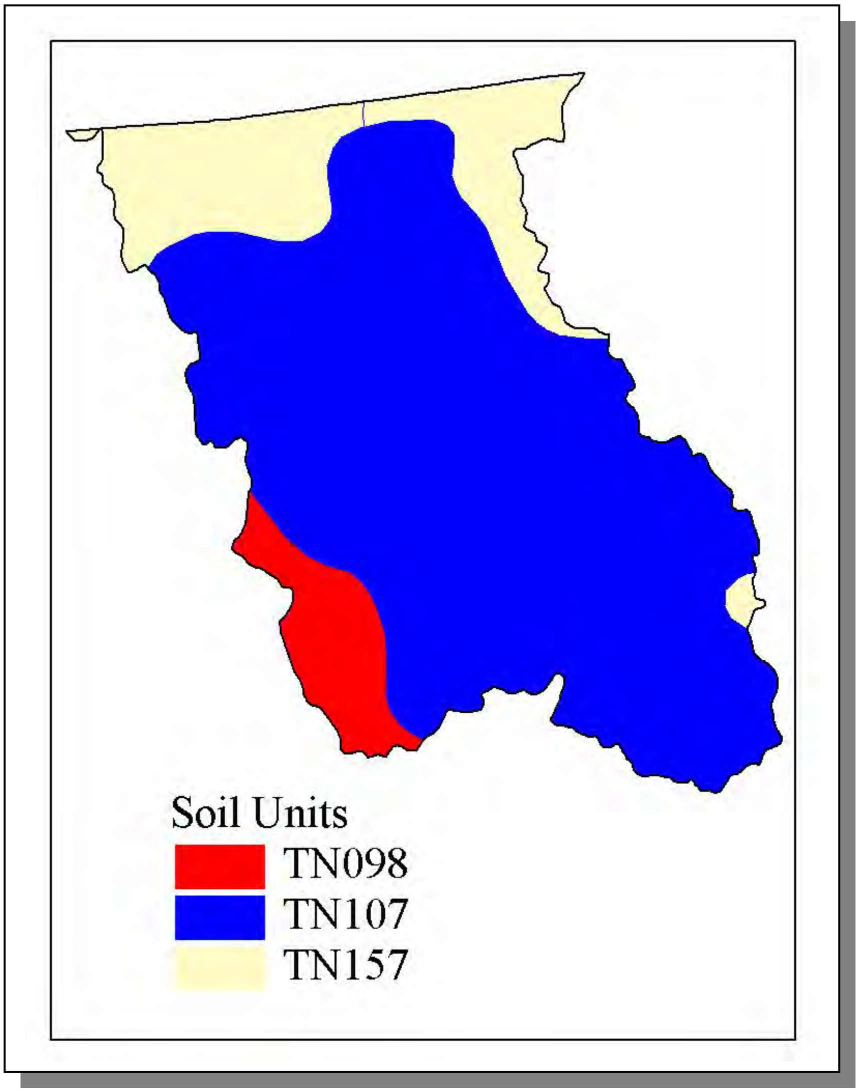

Figure 4-165. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040405.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN098	1.00	C	3.98	4.82	Loam	0.32
TN107	1.00	C	6.34	4.84	Loam	0.28
TN157	0.00	B	2.38	4.62	Loam	0.28

Table 4-131. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040405. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Scott	18,358	19,816	21,127	3.0	551	594	634	15.1

Table 4-132. Population Estimates in Subwatershed 051301040405.

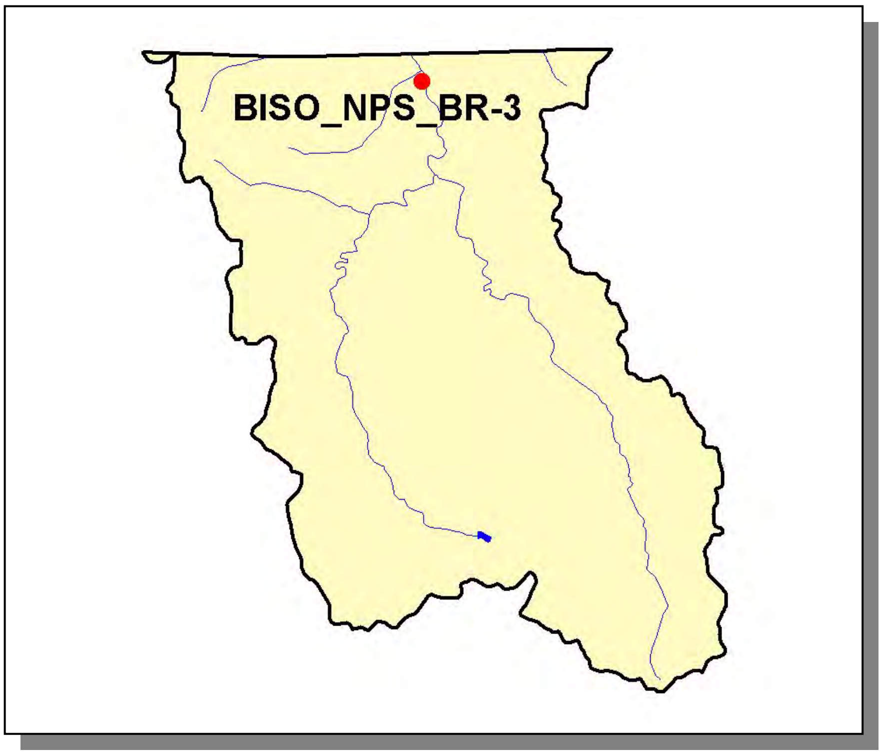

Figure 4-166. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301040405. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.D.v.a. Point Source Contributions.

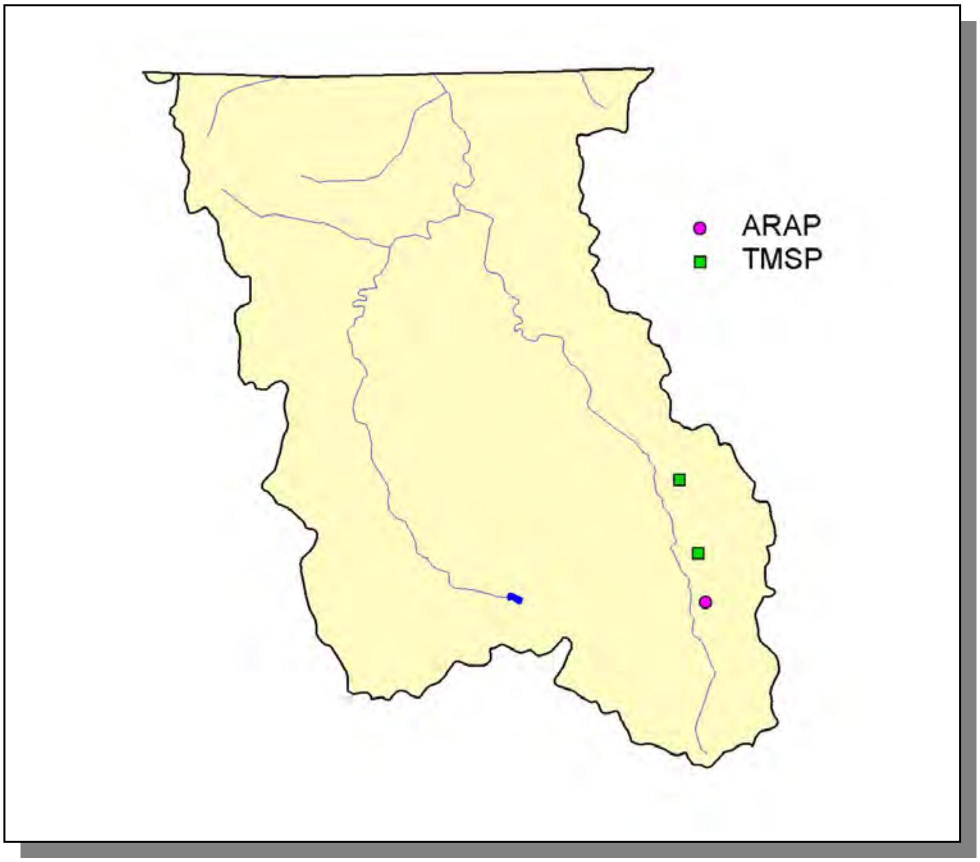

Figure 4-167. Location of Permits Issued in Subwatershed 051301040405. *More information, including the names of facilities, is provided in Appendix IV.*

***Figure 4-168. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 051301040405.** More information is provided in Appendix IV.*

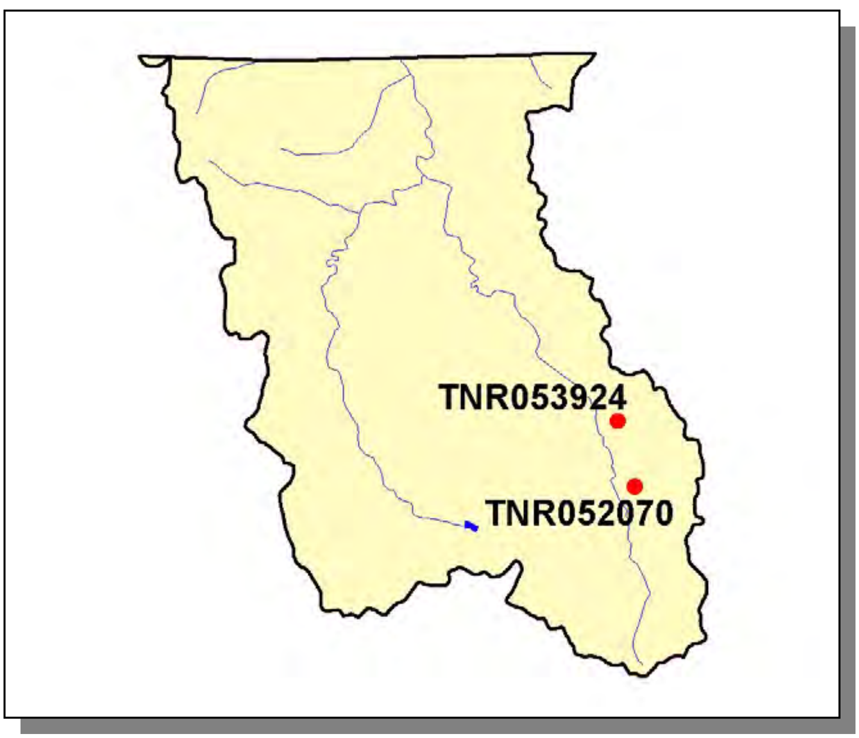

***Figure 4-169. Location of TMSP Sites in Subwatershed 051301040405.** More information, including the names of facilities, is provided in Appendix IV.*

4.2.D.v.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Hogs	Sheep
44	90	<5	40,185	0	<5

Table 4-133. Summary of Livestock Count Estimates in Subwatershed 051301040405. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Chickens (Layers)	Hogs	Sheep
Scott	2,177	4,447	216	1,989,506	196	17	74

Table 4-134. Summary of Livestock Count Estimates in Scott County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Scott	300.3	300.3	5.5	21.4

Table 4-135. Forest Acreage and Annual Removal Rates (1987-1994) in Scott County.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.33
Grass, Forbs, Legumes (Mixed Pasture)	0.58
Farmsteads and Ranch Headquarters	0.09

Table 4-136. Annual Estimated Total Soil Loss in Subwatershed 051301040405.

4.3.D.vi. 051301040407 (Roaring Paunch Creek).

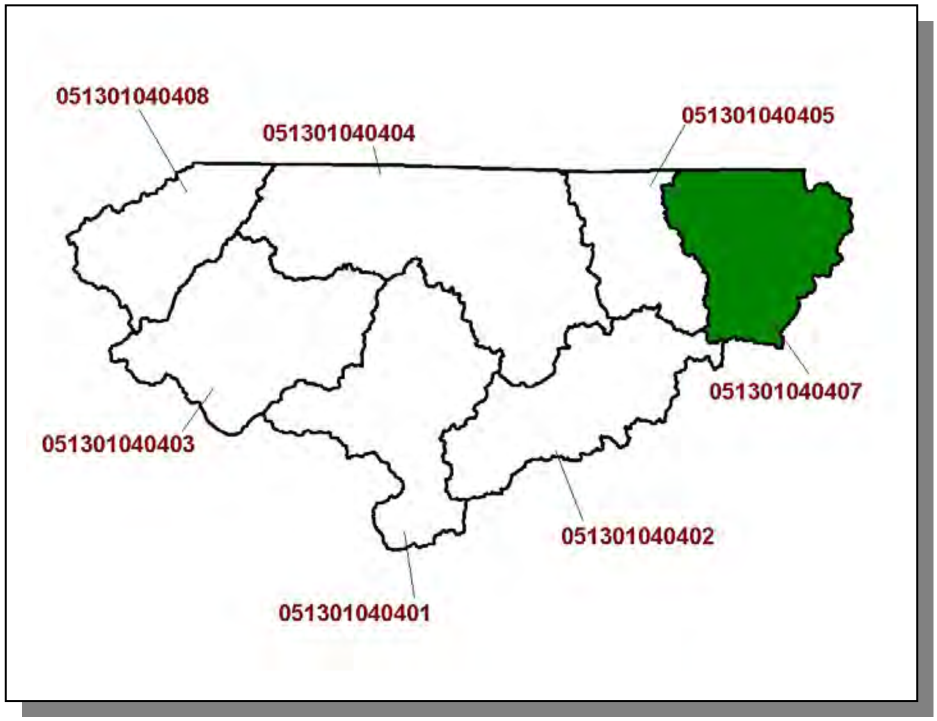

Figure 4-170. Location of Subwatershed 051301040407. *All South Fork Cumberland River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

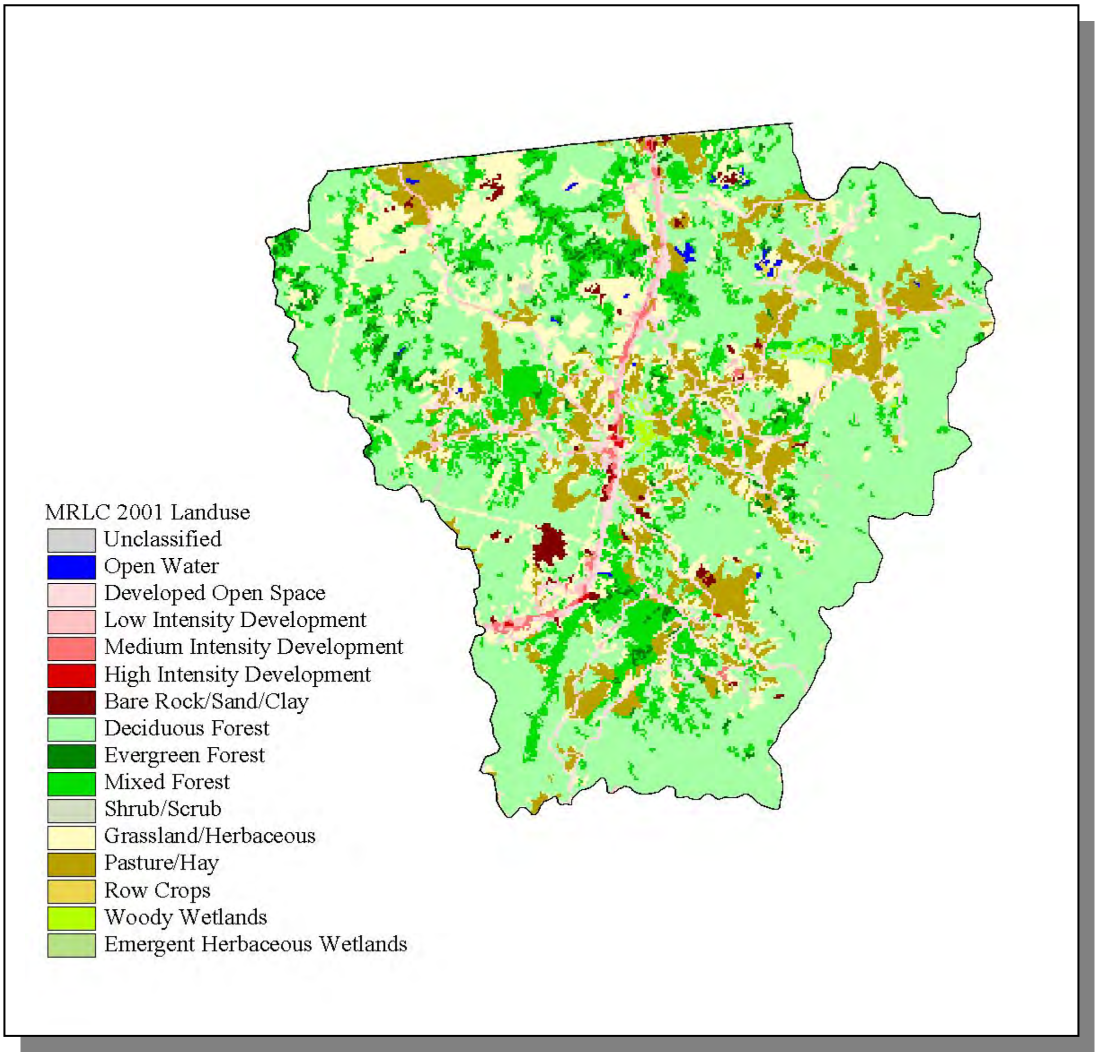

Figure 4-171. Illustration of Land Use Distribution in Subwatershed 051301040407.

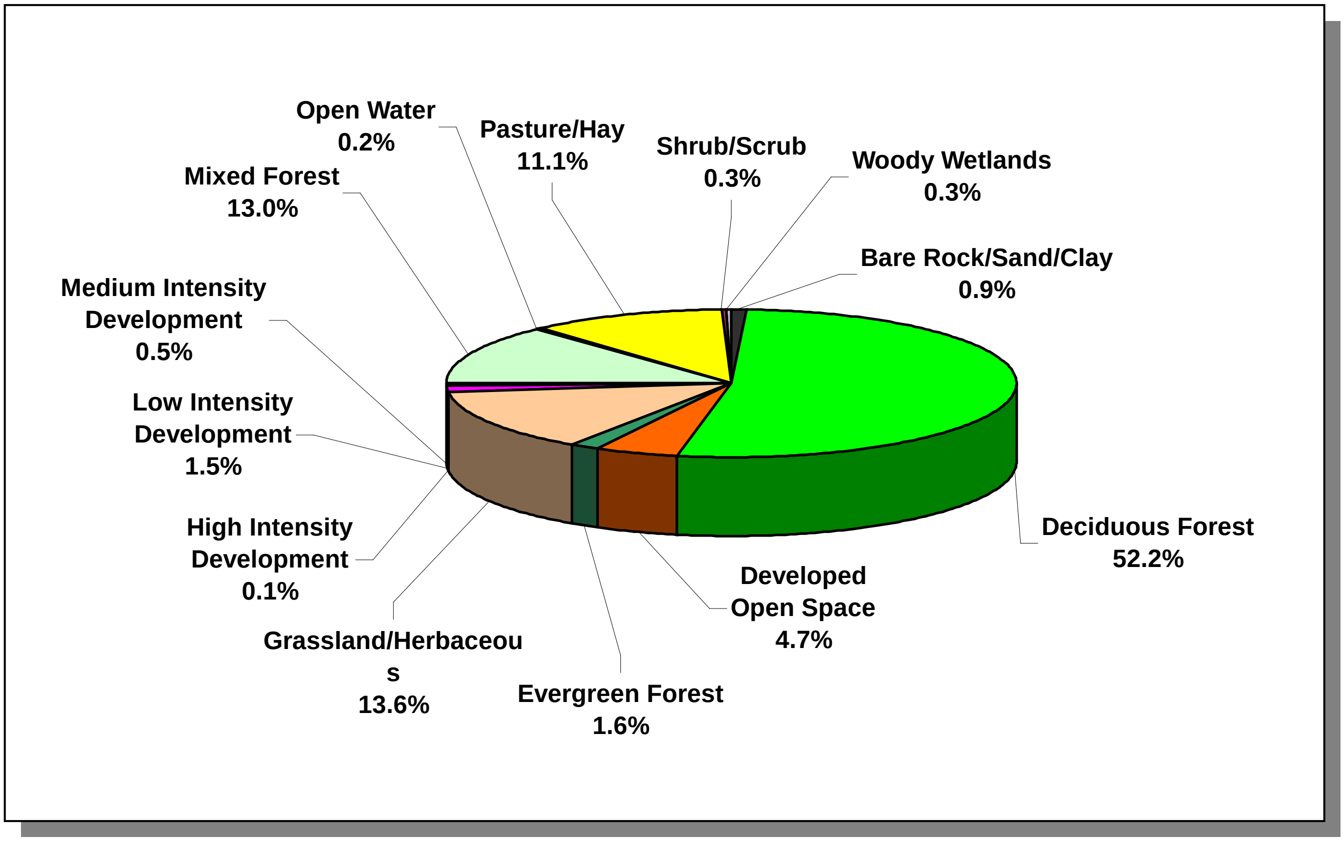

Figure 4-172. Land Use Distribution in Subwatershed 051301040407. *More information is provided in Appendix IV.*

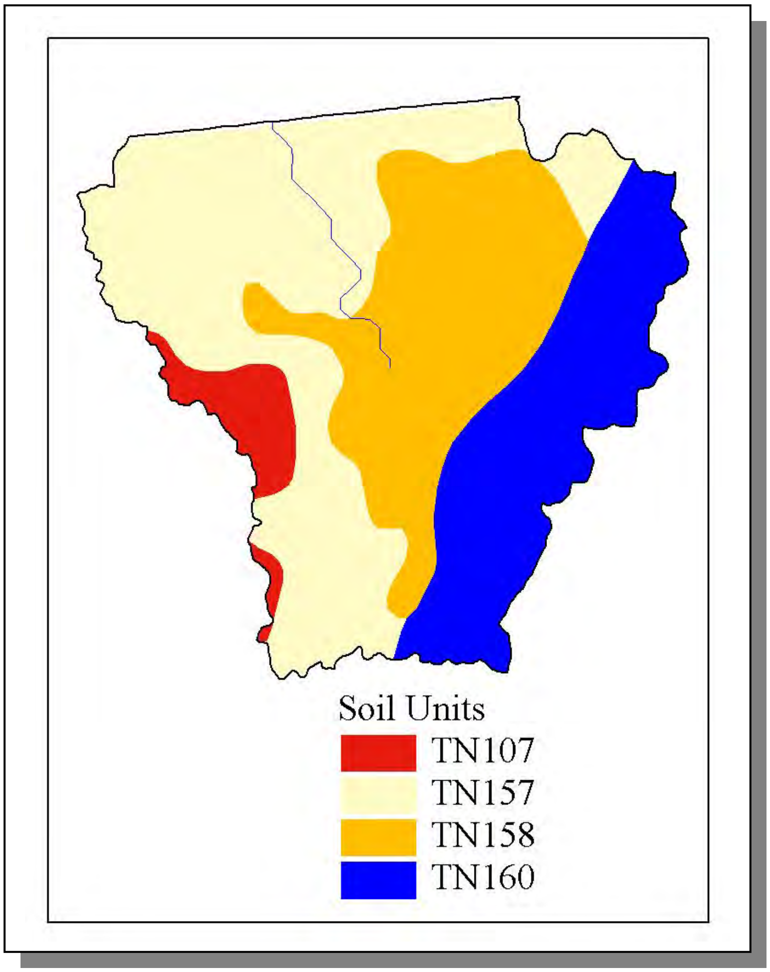

Figure 4-173. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040407.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN107	1.00	C	6.34	4.84	Loam	0.28
TN157	0.00	B	2.38	4.62	Loam	0.28
TN158	22.00	C	1.89	5.14	Silty Loam	0.29
TN160	0.00	B	2.69	5.36	Loam	0.25

Table 4-137. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040407. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Scott	18,358	19,816	21,127	4.58	840	907	967	15.1

Table 4-138. Population Estimates in Subwatershed 051301040407.

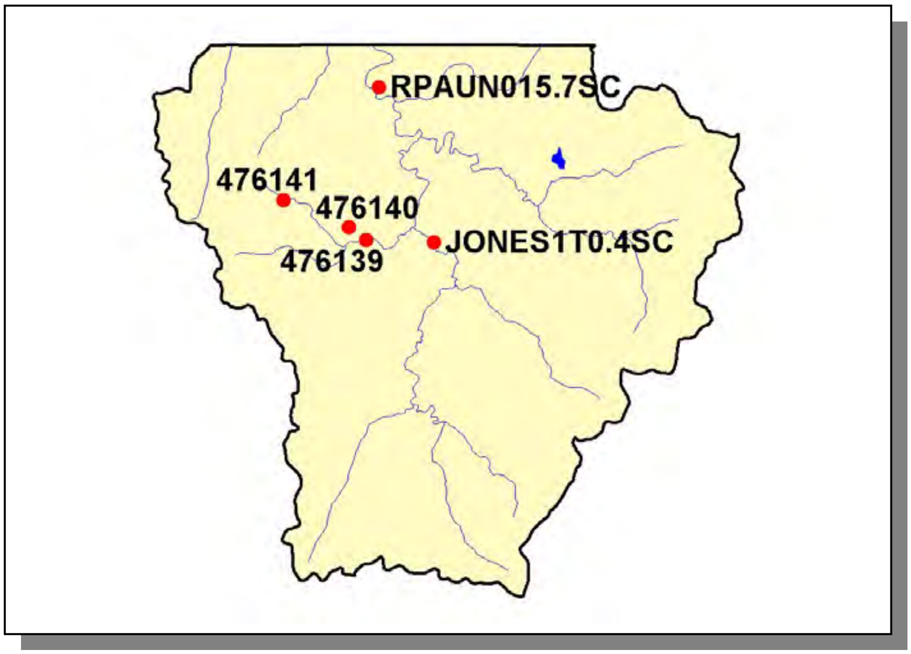

Figure 4-174. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301040407. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.D.vi.a. Point Source Contributions.

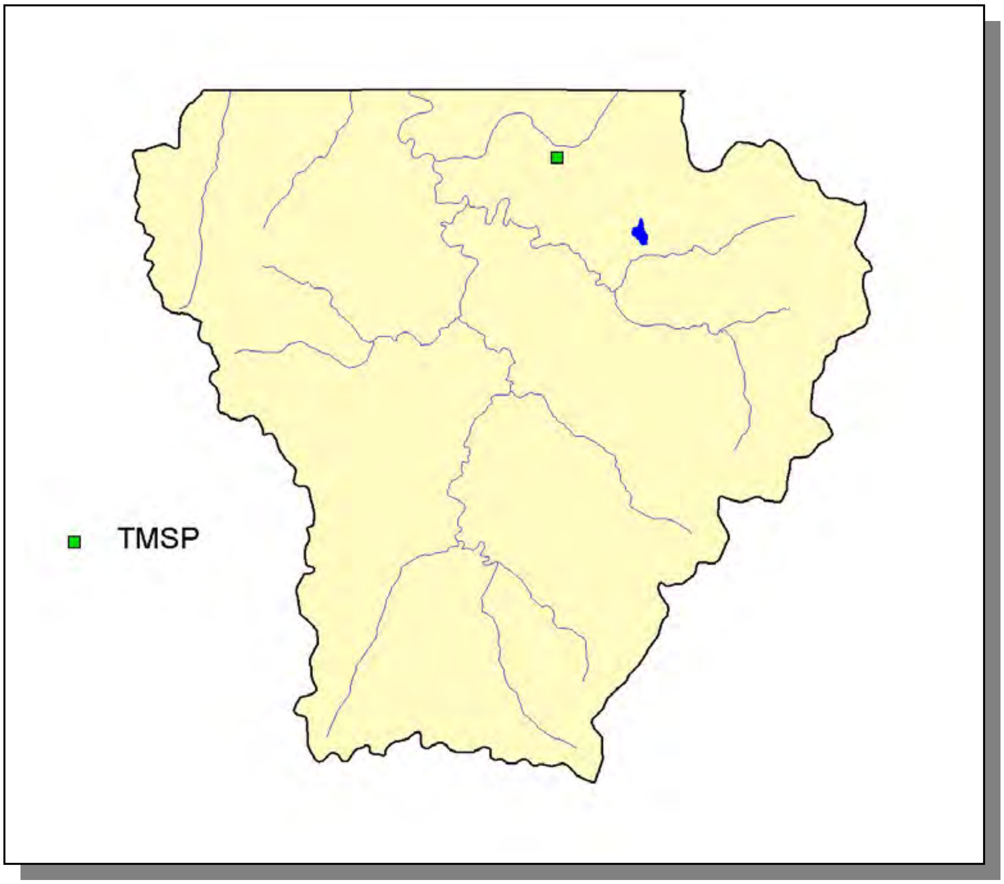

Figure 4-175. Location of Permits Issued in Subwatershed 051301040407. *More information, including the names of facilities, is provided in Appendix IV.*

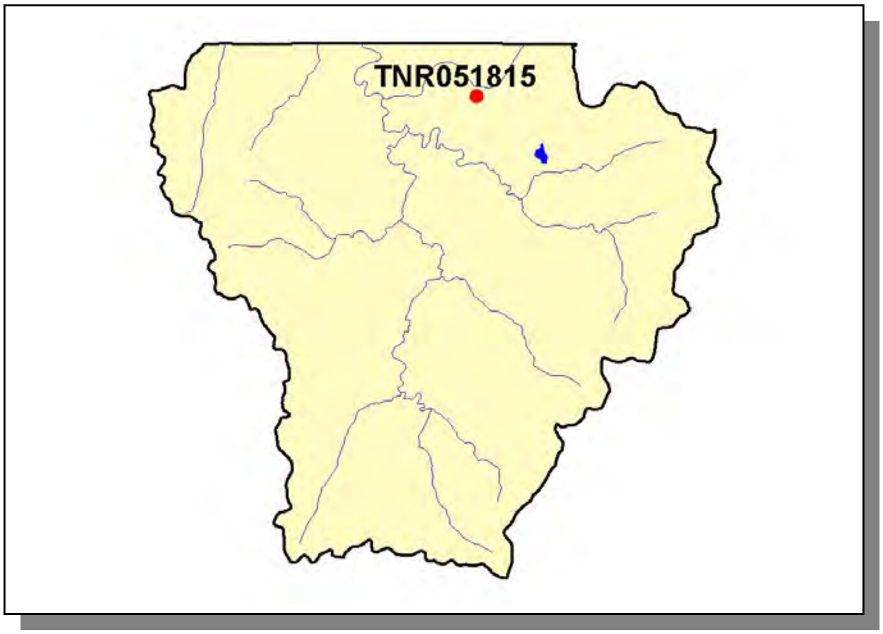

Figure 4-176. Location of TMSP Sites in Subwatershed 051301040407. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.D.vi.b. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
266	544	26	<5	243,273	<5	9

Table 4-139. Summary of Livestock Count Estimates in Subwatershed 051301040407. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Chickens (Layers)	Hogs	Sheep
Scott	2,177	4,447	216	1,989,506	196	17	74

Table 4-140. Summary of Livestock Count Estimates in Scott County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Scott	300.3	300.3	5.5	21.4

Table 4-141. Forest Acreage and Annual Removal Rates (1987-1994) in Scott County.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.33
Grass, Forbs, Legumes (Mixed Pasture)	0.58
Farmsteads and Ranch Headquarters	0.09

Table 4-142. Annual Estimated Total Soil Loss in Subwatershed 051301040407.

4.3.D.vii. 051301040408 (Rock Creek).

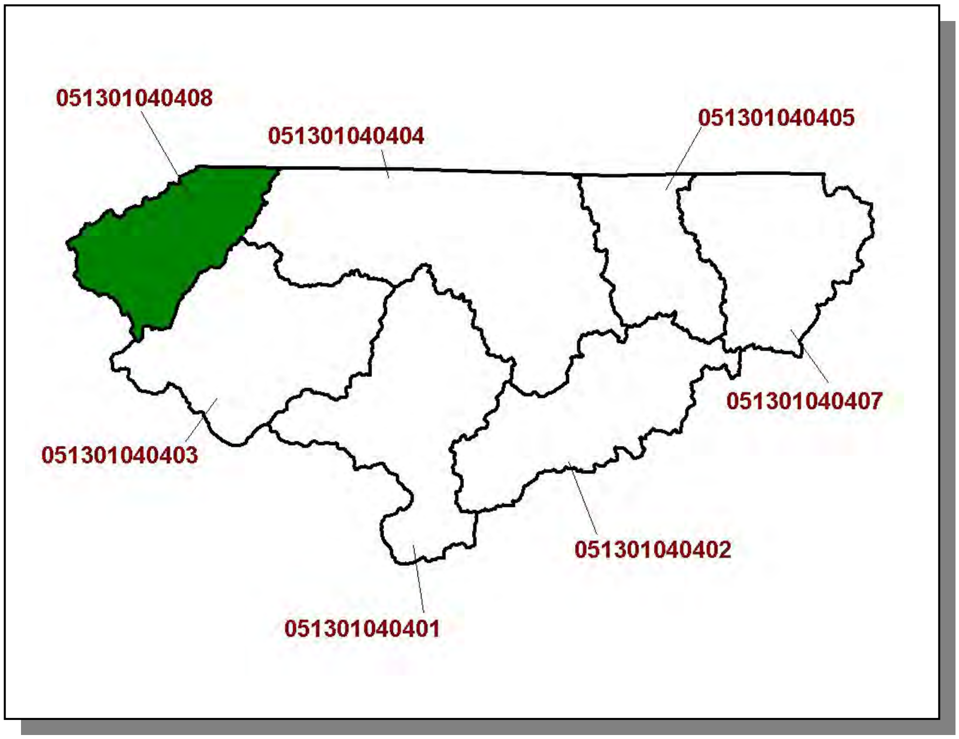

Figure 4-177. Location of Subwatershed 051301040408. *All South Fork Cumberland River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

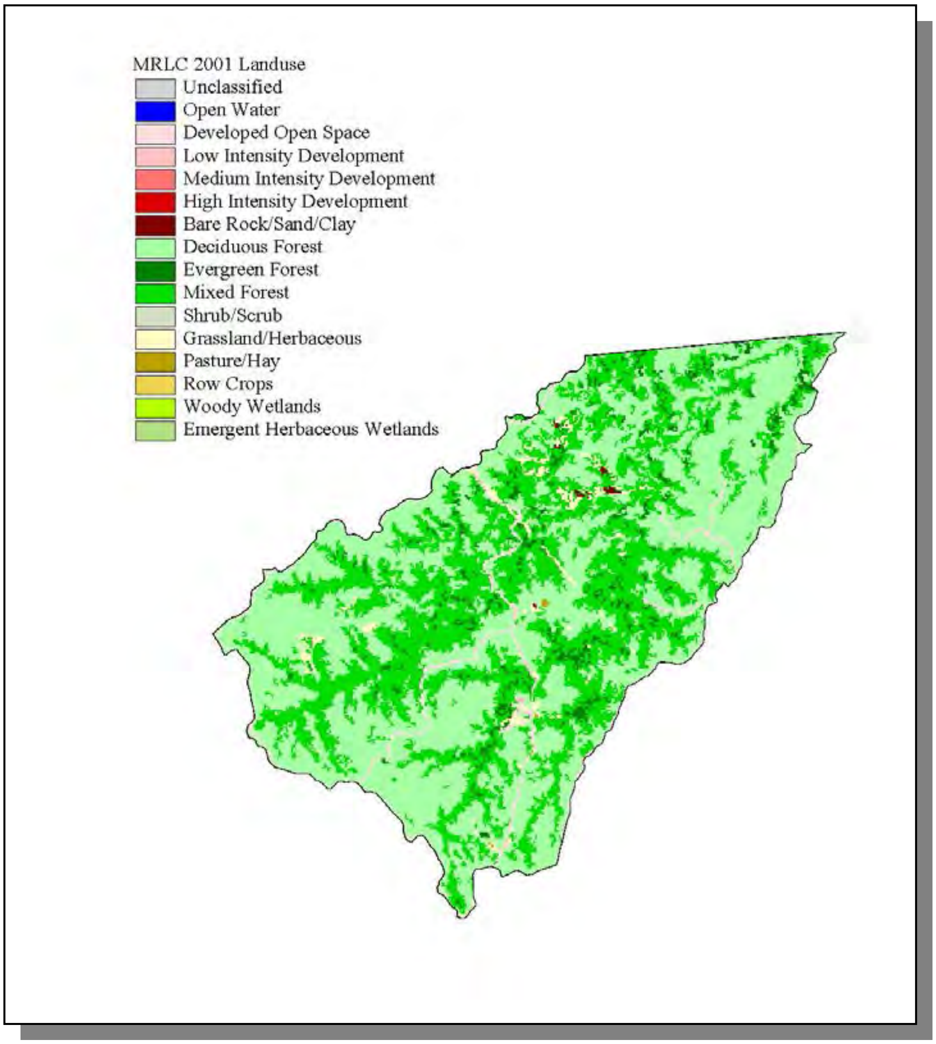

Figure 4-178. Illustration of Land Use Distribution in Subwatershed 051301040408.

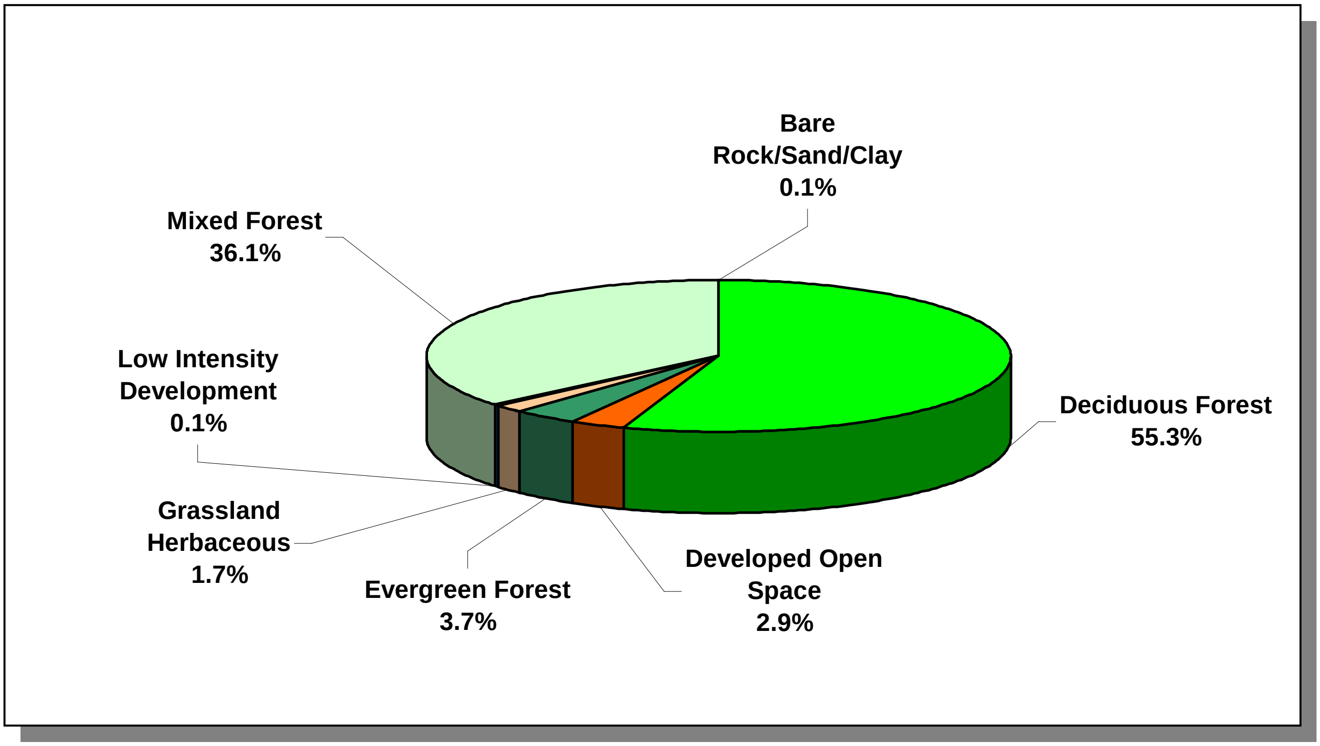

Figure 4-179. Land Use Distribution in Subwatershed 051301040408. *More information is provided in Appendix IV.*

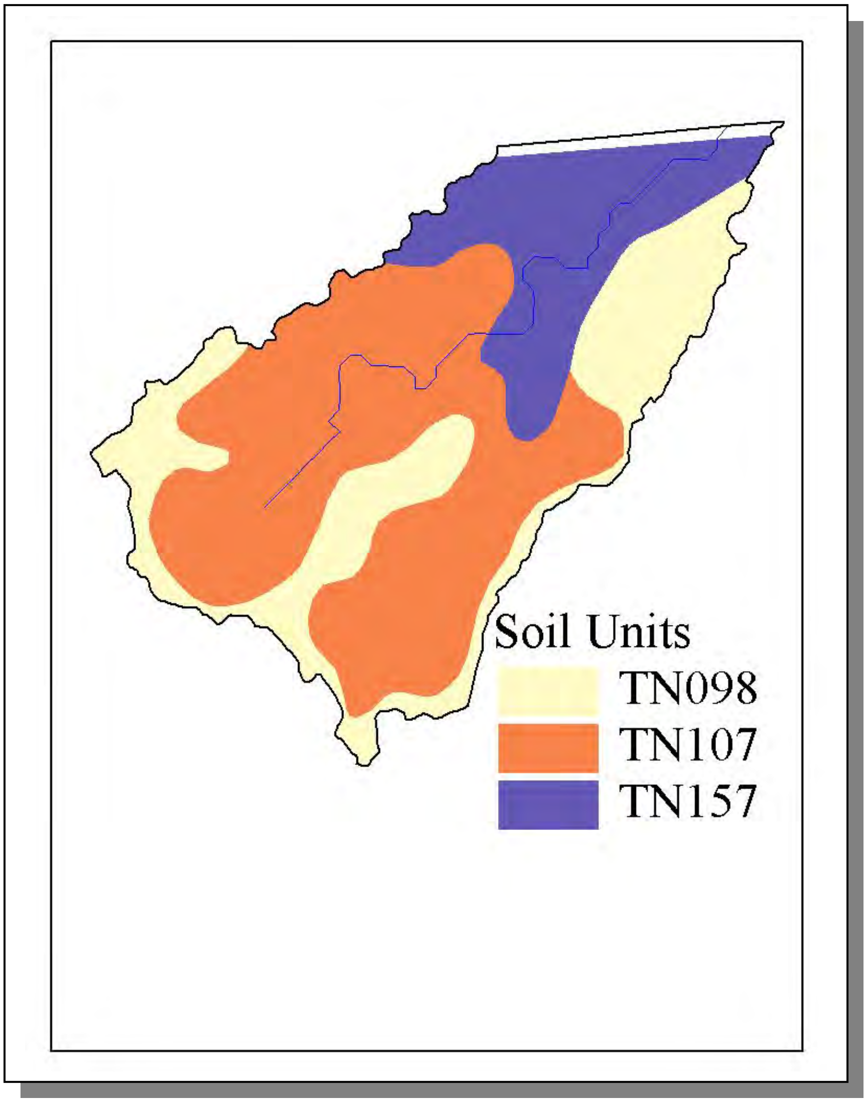

Figure 4-180. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040408.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN098	1.00	C	3.98	4.82	Loam	0.32
TN107	1.00	C	6.34	4.84	Loam	0.28
TN157	0.00	B	2.38	4.62	Loam	0.28

Table 4-143. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040408. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Fentress	14,669	15,920	16,625	0.61	90	98	102	13.3
Pickett	4,548	4,631	4,945	6.68	304	309	330	8.6
Scott	18,358	19,816	21,127	0.66	121	131	139	14.9
Total	**37,575**	**40,367**	**42,697**		**515**	**538**	**571**	**10.9**

Table 4-144. Population Estimates in Subwatershed 051301040408.

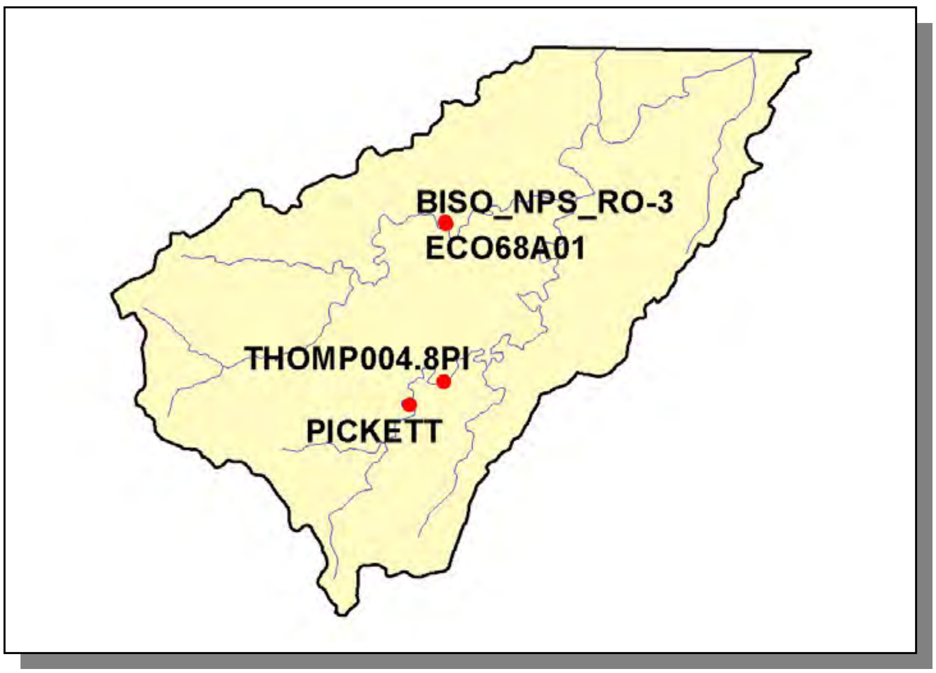

Figure 4-181. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301040408. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.D.vii.a. Point Source Contributions.

There are no point source contributions in this subwatershed.

4.2.D.vii.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS	
Beef Cow	Cattle
<5	<5

Table 4-145. Summary of Livestock Count Estimates in Subwatershed 051301040408. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Chickens (Layers)	Hogs	Sheep
Fentress	8,058	17,259	430	7,290,026	474	729	79
Pickett	5,986	10,864	19		285	99	
Scott	2,177	4,447	216	1,989,506	196	17	74

Table 4-146. Summary of Livestock Count Estimates in Fentress, Pickett, and Scott Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Fentress	244.1	244.1	3.6	14.3
Pickett	68.4	68.4	0.2	0.6
Scott	300.3	300.3	5.5	21.4

Table 4-147. Forest Acreage and Annual Removal Rates (1987-1994) in Fentress, Pickett, and Scott Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.89
Grass (Hayland)	0.11
Legumes, Grass (Hayland)	0.17
Grass, Forbs, Legumes (Mixed Pasture)	0.61
Corn (Row Crops)	16.18
Soybeans (Row Crops)	6.00
Tobacco (Row Crops)	23.18
Wheat (Close-Grown Cropland)	43.40
Other Vegetable and Truck Crops	15.94
Farmsteads and Ranch Headquarters	4.91

Table 4-148. Annual Estimated Total Soil Loss in Subwatershed 051301040408.

4.2.E. 0513010405.

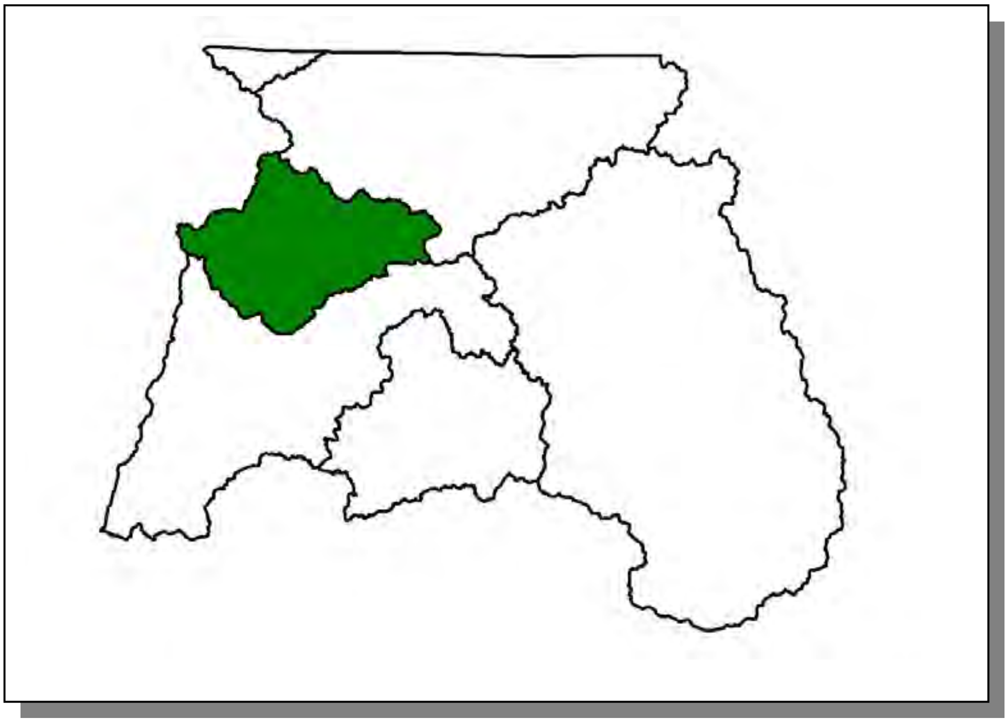

Figure 4-182. Location of Subwatershed 0513010405. *All South Fork Cumberland River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.3.E.i. 051301040501 (North Whiteoak Creek).

Figure 4-183. Location of Subwatershed 051301040501. *All South Fork Cumberland River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

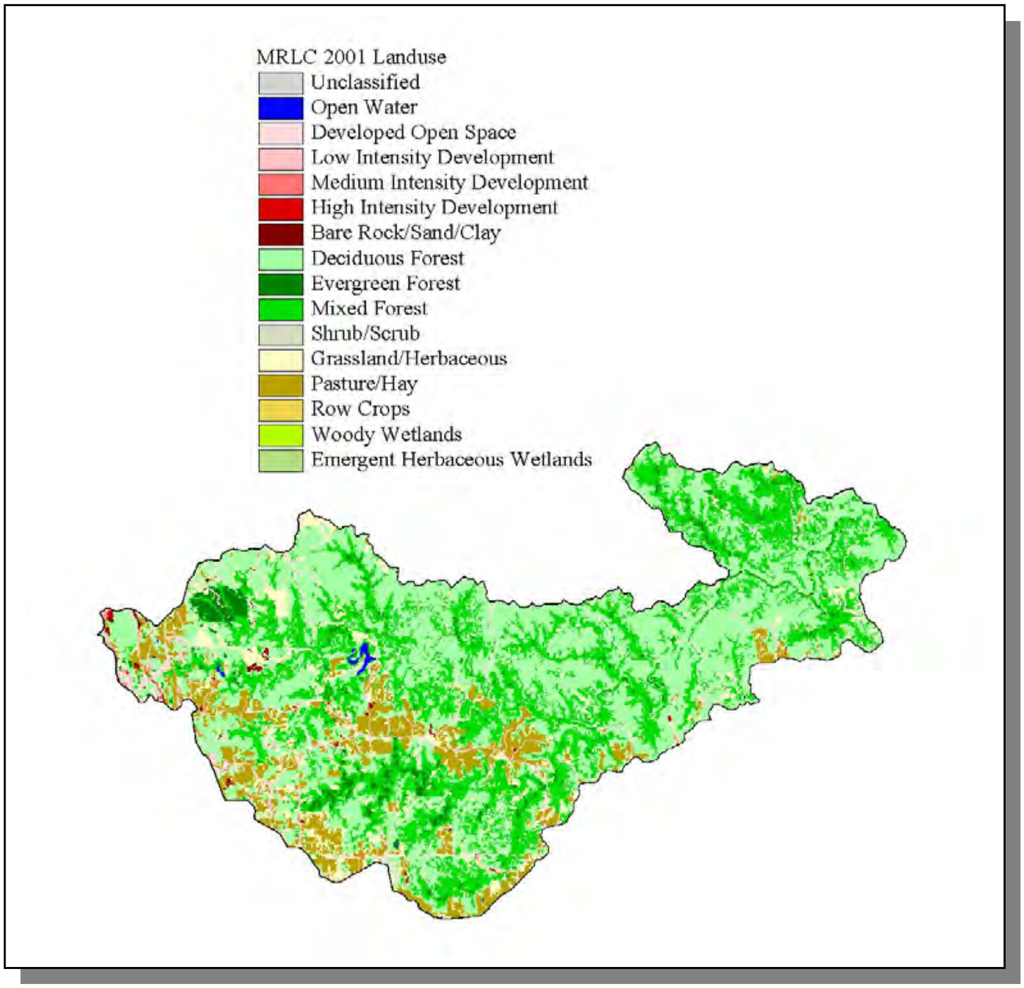

Figure 4-184. Illustration of Land Use Distribution in Subwatershed 051301040501.

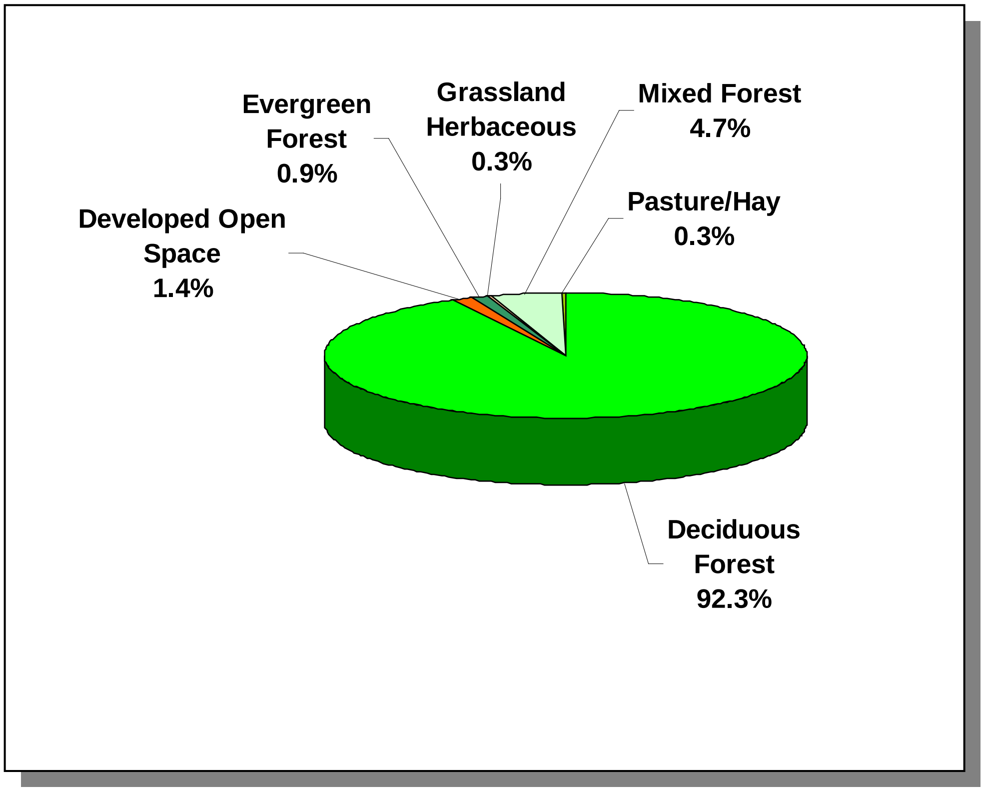

Figure 4-185. Land Use Distribution in Subwatershed 051301040501. *More information is provided in Appendix IV.*

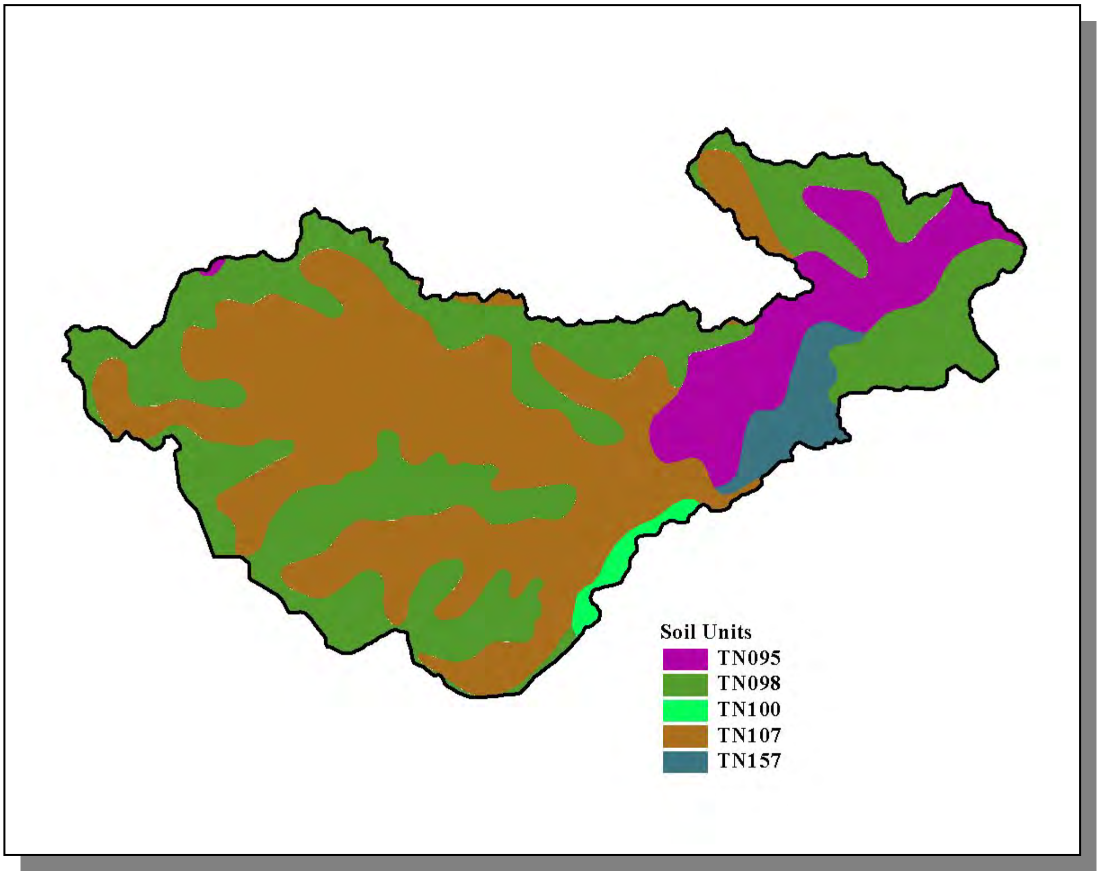

Figure 4-186. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040501.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN095	0.00	B	2.35	5.12	Loam	0.31
TN098	1.00	C	3.98	4.82	Loam	0.32
TN100	0.00	B	1.14	3.35	Silty Loam	0.21
TN107	1.00	C	6.34	4.84	Loam	0.28
TN157	0.00	B	2.38	4.62	Loam	0.28

Table 4-149. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040501. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Fentress	14,669	15,920	16,625	12.69	1,861	2,020	2,109	13.3
Scott	18,358	19,816	21,127	0.7	128	138	147	14.8
Total	**33,027**	**35,736**	**37,752**		**1,989**	**2,158**	**2,256**	**13.4**

Table 4-150. Population Estimates in Subwatershed 051301040501.

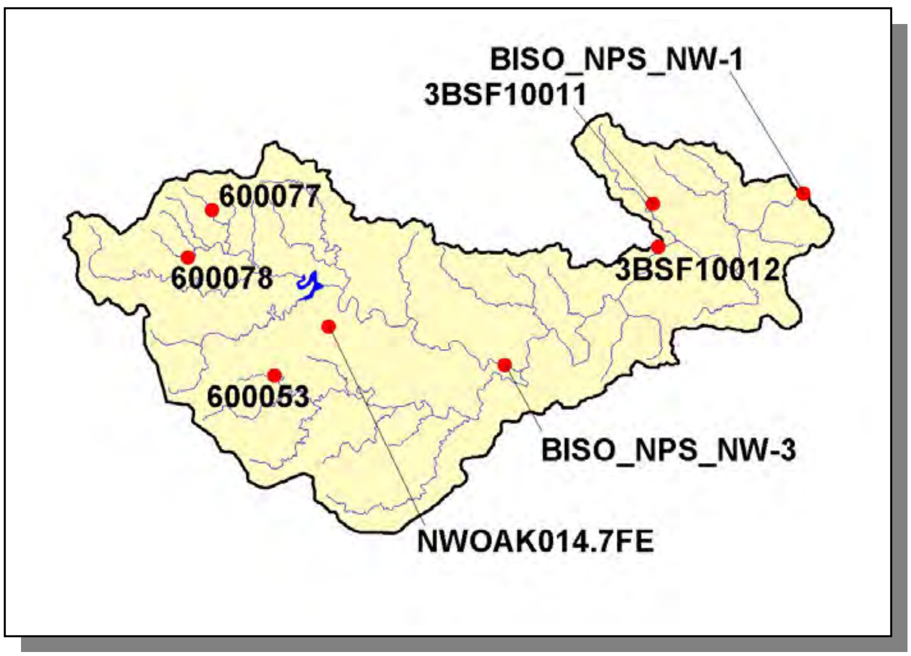

Figure 4-187. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301040501. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.E.i.a. Point Source Contributions.

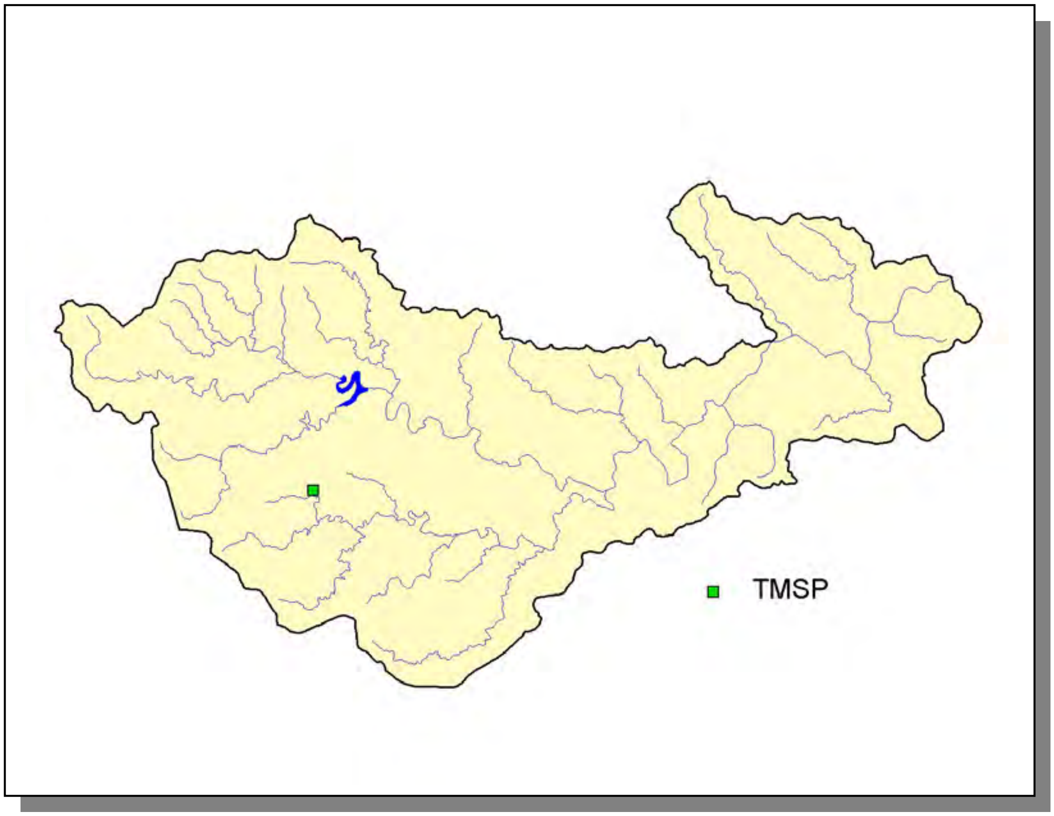

Figure 4-188. Location of Permits Issued in Subwatershed 051301040501. *More information, including the names of facilities, is provided in Appendix IV.*

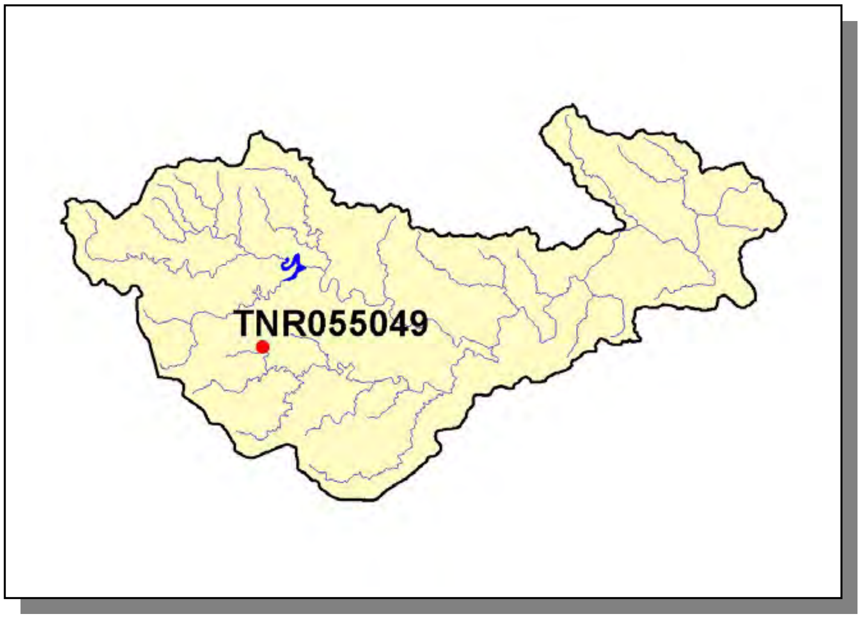

Figure 4-189. Location of TMSP Sites in Subwatershed 051301040501. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.E.i.b. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
916	1,963	49	<5	829,146	83	9

Table 4-151. Summary of Livestock Count Estimates in Subwatershed 051301040501. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Chickens (Layers)	Hogs	Sheep
Fentress	8,058	17,259	430	7,290,026	474	729	79
Scott	2,177	4,447	216	1,989,506	196	17	74

Table 4-152. Summary of Livestock Count Estimates in Fentress and Scott Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Fentress	244.1	244.1	3.6	14.3
Scott	300.3	300.3	5.5	21.4

Table 4-153. Forest Acreage and Annual Removal Rates (1987-1994) in Fentress and Scott Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.70
Legumes, Grass (Hayland)	0.56
Grass, Forbs, Legumes (Mixed Pasture)	0.29
Corn (Row Crops)	16.18
Soybeans (Row Crops)	6.00
Wheat (Close-Grown Cropland)	43.40
Other Vegetable and Truck Crops	15.94
Farmsteads and Ranch Headquarters	0.38

Table 4-154. Annual Estimated Total Soil Loss in Subwatershed 051301040501.

4.3.E.ii. 051301040502 (Laurel Fork).

Figure 4-190. Location of Subwatershed 051301040502. *All South Fork Cumberland River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

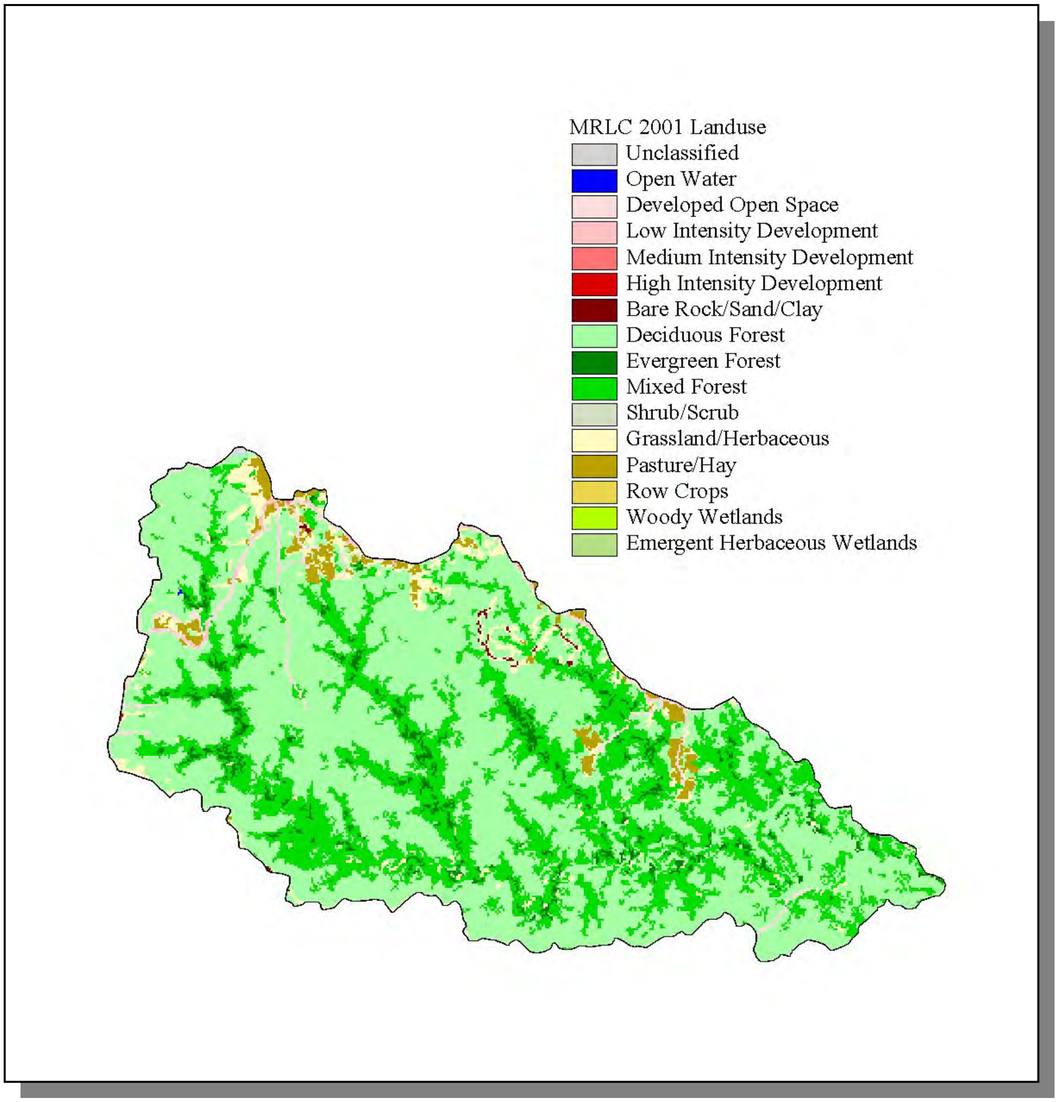

Figure 4-191. Illustration of Land Use Distribution in Subwatershed 051301040502.

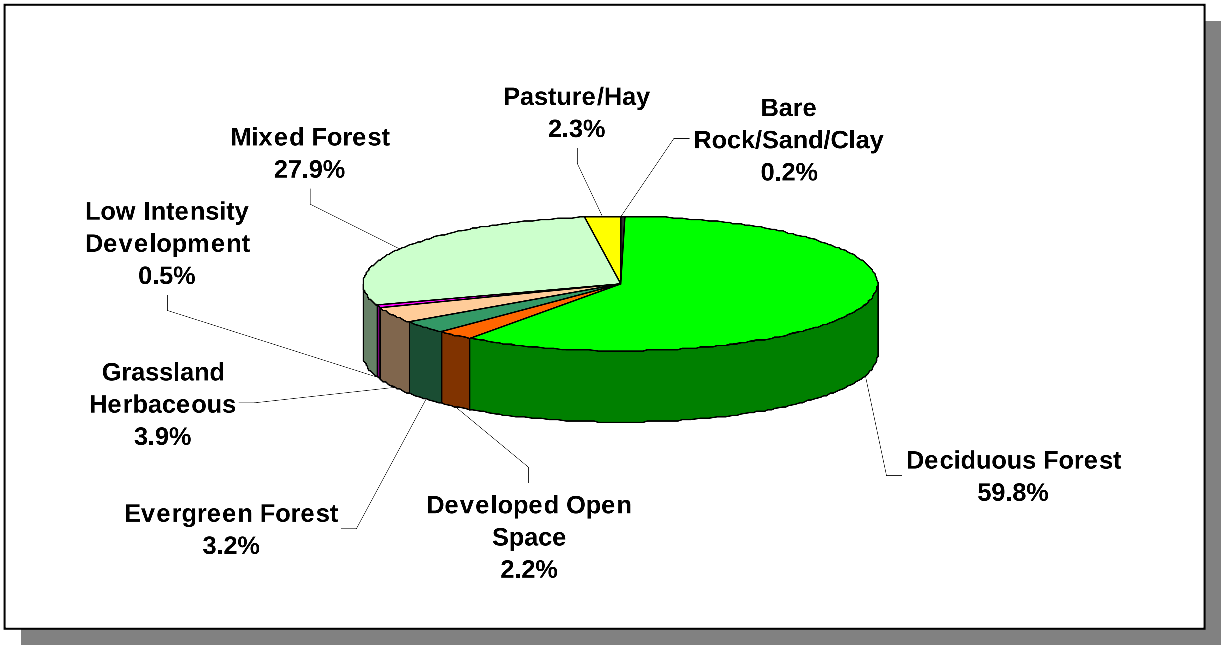

Figure 4-192. Land Use Distribution in Subwatershed 051301040502. *More information is provided in Appendix IV.*

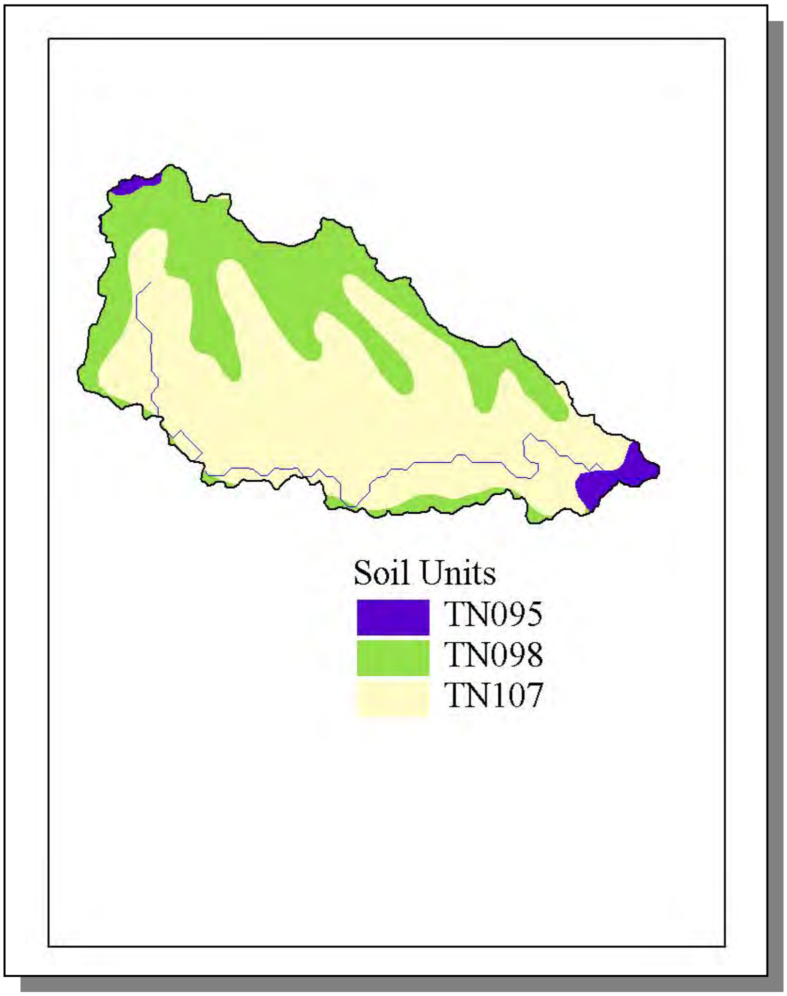

Figure 4-193. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040502.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN095	0.00	B	2.35	5.12	Loam	0.31
TN098	1.00	C	3.98	4.82	Loam	0.32
TN107	1.00	C	6.34	4.84	Loam	0.28

Table 4-155. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040502. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Fentress	14,669	15,920	16,625	4.32	634	688	718	13.2

Table 4-156. Population Estimates in Subwatershed 051301040502.

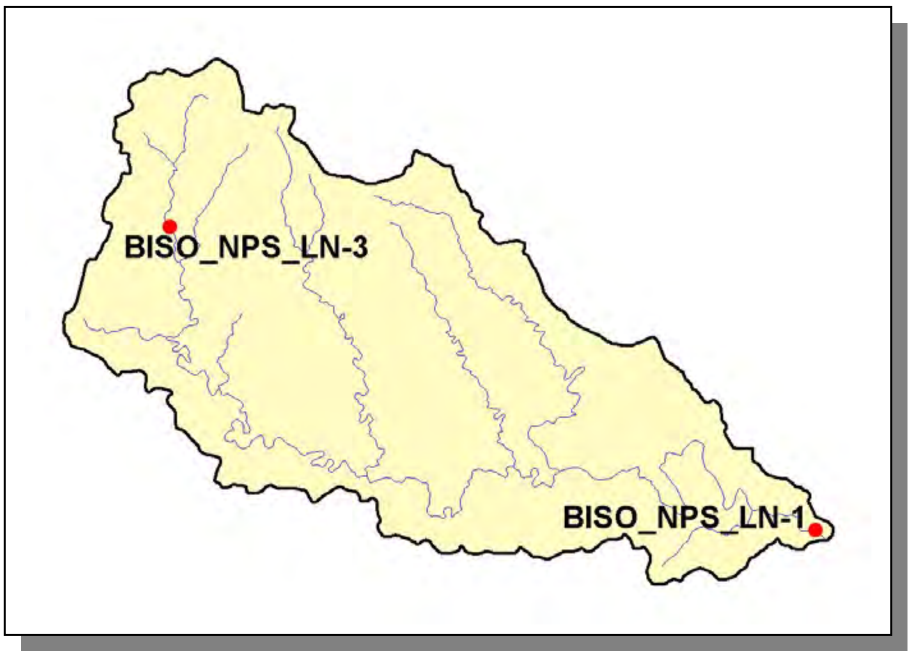

Figure 4-194. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301040502. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.3.E.ii.a. Point Source Contributions.

There are no point source contributions in this subwatershed.

4.2.E.ii.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Hogs	Sheep
75	161	<5	68,091	7	<5

Table 4-157. Summary of Livestock Count Estimates in Subwatershed 051301040502. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Chickens (Layers)	Hogs	Sheep
Fentress	8,058	17,259	430	7,290,026	474	729	79

Table 4-158. Summary of Livestock Count Estimates in Fentress County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Fentress	244.1	244.1	3.6	14.3

Table 4-159. Forest Acreage and Annual Removal Rates (1987-1994) in Fentress County.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.72
Legumes, Grass (Hayland)	0.56
Grass, Forbs, Legumes (Mixed Pasture)	0.27
Corn (Row Crops)	16.18
Soybeans (Row Crops)	6.00
Wheat (Close-Grown Cropland)	43.40
Other Vegetable and Truck Crops	15.94
Farmsteads and Ranch Headquarters	0.40

Table 4-160. Annual Estimated Total Soil Loss in Subwatershed 0604000401.

4.2.F. 0513010407.

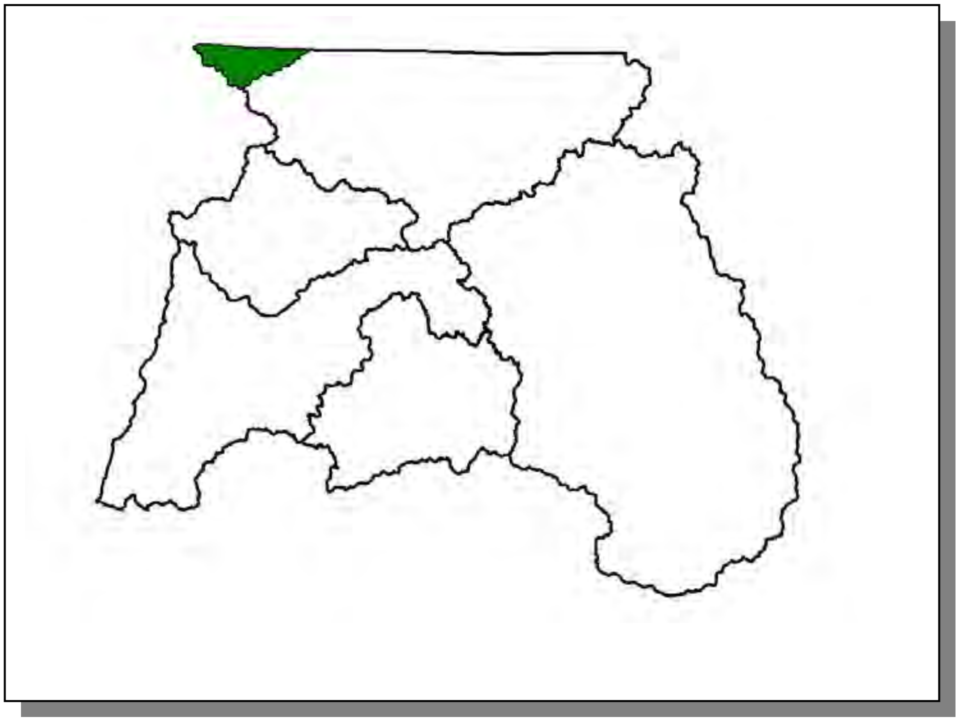

Figure 4-195. Location of Subwatershed 0513010407. *All South Fork Cumberland River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.3.F.i. 051301040701 (Little South Fork).

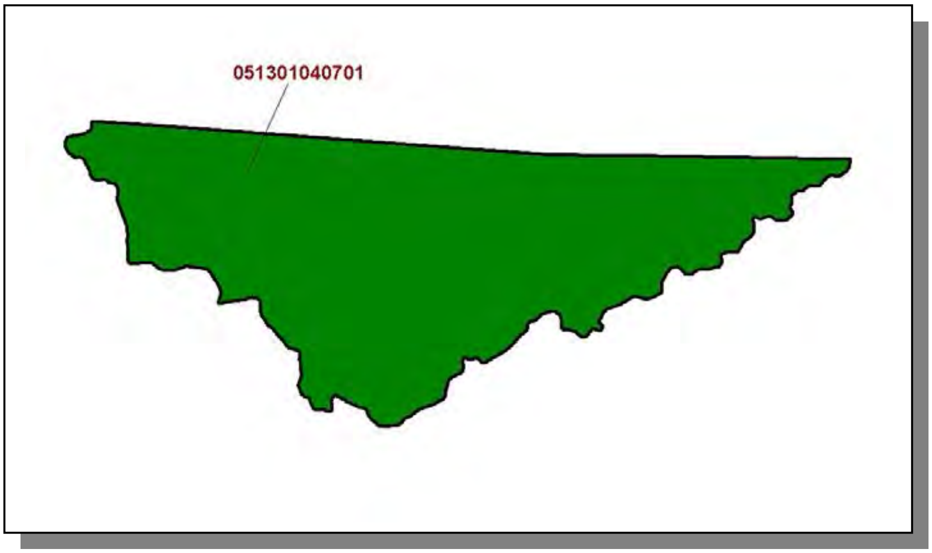

Figure 4-196. Location of Subwatershed 051301040701. *All South Fork Cumberland River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

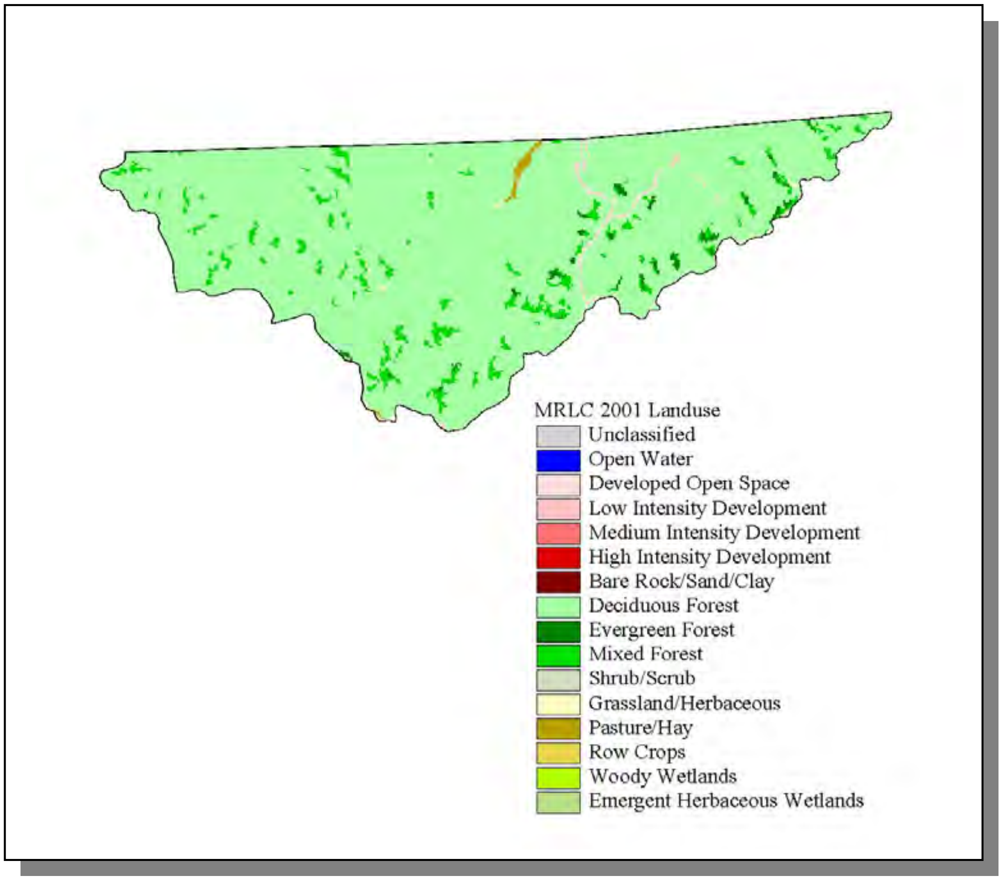

Figure 4-197. Illustration of Land Use Distribution in Subwatershed 051301040701.

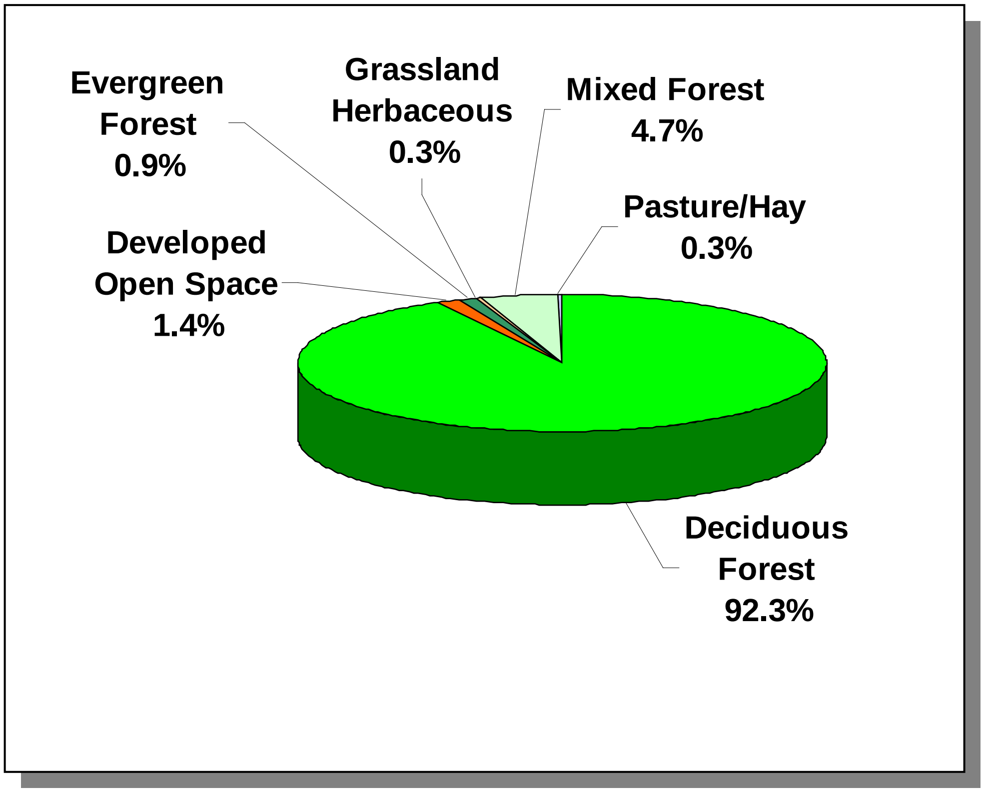

Figure 4-198. Land Use Distribution in Subwatershed 051301040701. *More information is provided in Appendix IV.*

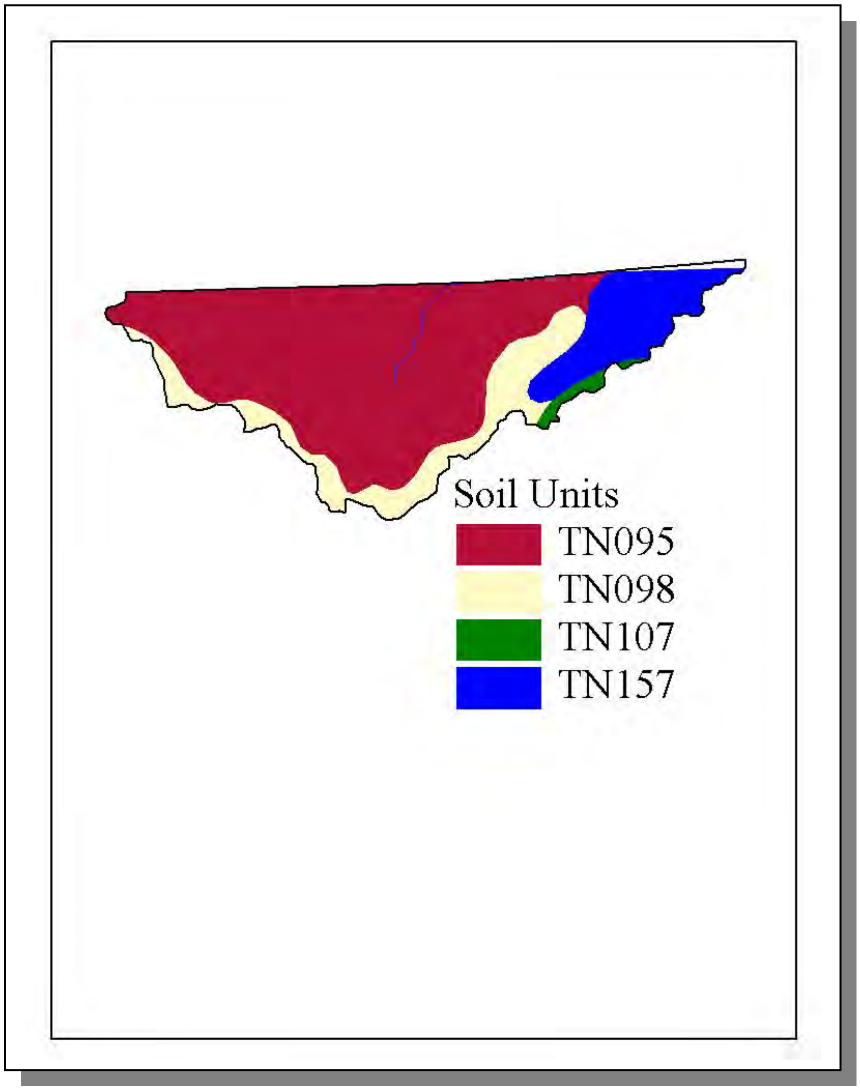

Figure 4-199. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040701.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN095	0.00	B	2.35	5.12	Loam	0.31
TN098	1.00	C	3.98	4.82	Loam	0.32
TN107	1.00	C	6.34	4.84	Loam	0.28
TN157	0.00	B	2.38	4.62	Loam	0.28

Table 4-161. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301040701. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Fentress	14,669	15,920	16,625	0.02	3	3	3	0.0
Pickett	4,548	4,631	4,945	5.54	252	257	274	8.7
Total	**19,219**	**20,551**	**21570**		**255**	**260**	**277**	**8.6**

Table 4-162. Population Estimates in Subwatershed 051301040701.

4.3.F.i.a. Point Source Contributions.

There are no point source contributions in this subwatershed.

4.2.F.i.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS			
Beef Cow	Cattle	Chickens (Broilers Sold)	Hogs
88	161	127	<5

Table 4-163. Summary of Livestock Count Estimates in Subwatershed 051301040701. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* **"***Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Chickens (Layers)	Hogs	Sheep
Fentress	8,058	17,259	430	7,290,026	474	729	79
Pickett	5,986	10,864	19		285	99	
Scott	2,177	4,447	216	1,989,506	196	17	74

Table 4-164. Summary of Livestock Count Estimates in Fentress, Pickett, and Scott Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* **"***Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Fentress	244.1	244.1	3.6	14.3
Pickett	68.4	68.4	0.2	0.6
Scott	300.3	300.3	5.5	21.4

Table 4-165. Forest Acreage and Annual Removal Rates (1987-1994) in Fentress, Pickett, and Scott Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	1.10
Grass (Hayland)	0.11
Legumes, Grass (Hayland)	0.07
Grass, Forbs, Legumes (Mixed Pasture)	0.70
Corn (Row Crops)	16.18
Soybeans (Row Crops)	6.00
Tobacco (Row Crops)	23.18
Wheat (Close-Grown Cropland)	43.40
Other Vegetable and Truck Crops	15.94
Farmsteads and Ranch Headquarters	7.34

Table 4-166. Annual Estimated Total Soil Loss in Subwatershed 051301040701.

CHAPTER 5

WATER QUALITY PARTNERSHIPS IN THE SOUTH FORK CUMBERLAND RIVER WATERSHED

5.1. BACKGROUND. The Watershed Approach relies on participation at the federal, state, local and nongovernmental levels to be successful. Two types of partnerships are critical to ensure success:

- Partnerships between agencies
- Partnerships between agencies and landowners

This chapter describes both types of partnerships in the South Fork Cumberland River Watershed. The information presented is provided by the agencies and organizations described.

5.2. FEDERAL PARTNERSHIPS.

5.2.A. Natural Resources Conservation Service. The Natural Resources Conservation Service (NRCS), an agency of the U.S. Department of Agriculture, provides technical assistance, information, and advice to citizens in their efforts to conserve soil, water, plant, animal, and air resources on private lands.

Performance Results System (PRS) is a Web-based database application providing USDA Natural Resources Conservation Service, conservation partners, and the public fast and easy access to accomplishments and progress toward strategies and performance. The PRS may be viewed at http://prms.nrcs.usda.gov/prs. From the opening menu, select "Reports" in the top tool bar. You will select the time period that you are interested in and the conservation treatment of interest on the page that comes up. Depending on the time period of interest, you will have various report options to choose from, such as location, reporting period and program involved in the reporting. You may be required to "refresh" the page in order to get the current report to come up.

The data can be used to determine broad distribution trends in service provided to customers by NRCS conservation partnerships. These data do not show sufficient detail to enable evaluation of site-specific conditions (e.g., privately-owned farms and ranches) and are intended to reflect general trends.

Conservation Practice	Feet	Acres	Number
Conservation Buffers	42,400	17	
Erosion Control		1,316	
Nutrient Management		10,945	2
Pest Management		10,855	30
Grazing / Forages	99,432	9,912	
Tree and Shrub Practices		3,921	
Tillage and Cropping		990	
Waste Management Systems			13
Wildlife Habitat Management		4,531	
Water Supply	6,200		11

Table 5-1. Landowner Conservation Practices in Partnership with NRCS in the Tennessee Portion of the South Fork Cumberland River Watershed. *Data are from PRMS for October 1, 2001 through September 30, 2005 reporting period. More information is provided in Appendix V.*

5.2.B. United States Geological Survey – Tennessee Water Science Center Programs. The United States Geological Survey (USGS) provides relevant and objective scientific information and data for public use in evaluation of the quantity, quality, and use of the Nation's water resources. National USGS water resource assessments include the National Streamflow Information Program (http://water.usgs.gov/nsip/), National Atmospheric Deposition Network (http://bqs.usgs.gov/acidrain/), the National Stream Quality Accounting Network (http://water.usgs.gov/nasqan/), and the National Water-Quality Assessment Program (http://water.usgs.gov/nawqa). For a national overview of USGS water resources programs, please visit http://water.usgs.gov. Specific information on the Upper and Lower Tennessee River NAWQA study units can be found at http://tn.water.usgs.gov/lten/tenn.html .

In addition to National assessments, the USGS also conducts hydrologic investigations and data collection in cooperation with numerous Federal, State, and local agencies to address issues of National, regional, and local concern. Hydrologic investigations conducted by the USGS Tennessee Water Science Center address scientific questions pertaining to five general thematic topics:

1. Water Use and Availability,
2. Landforms and Ecology,
3. Watersheds and Land Use,
4. Occurrence, Fate, and Transport of Contaminants, and
5. Floods and Droughts.

In support of these investigations, the USGS Tennessee Water Science Center records streamflow continuously at more than 100 gaging stations, makes instantaneous measurements of streamflow at numerous other locations as needed or requested, monitors ground-water levels Statewide, and analyzes the physical, chemical, and biologic characteristics of surface and ground waters. In addition, the Water Science Center compiles annual water-use records for the State of Tennessee and collects a variety of data in support of National USGS baseline and other networks. More information pertaining to USGS activities in Tennessee can be accessed at http://tn.water.usgs.gov .

USGS Water Resources Information on the Internet. Real-time and historical streamflow, water-level, and water-quality data at sites operated by the USGS Tennessee Water Science Center can be accessed on-line at http://waterdata.usgs.gov/tn/nwis/nwis . Data can be retrieved by county, hydrologic unit code, or major river basin using drop-down menus on the web page. For specific information or questions about USGS streamflow data, contact Donna Flohr at (615) 837-4730 or dfflohr@usgs.gov . Recent USGS Tennessee Water Science Center publications can be accessed by visiting http://tn.water.usgs.gov/pubpg.html . A searchable bibliographic database is also provided for locating other USGS reports and products addressing specific scientific topics.

5.2.C. U.S. Fish and Wildlife Service. The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people. Sustaining our nation's fish and wildlife resources is a task that can be accomplished only through the combined efforts of governments, businesses, and private citizens. The U.S. Fish and Wildlife Service (Service) works with State and Federal agencies and Tribal governments, helps corporate and private landowners conserve habitat, and cooperates with other nations to halt illegal wildlife trade. The Service also administers a Federal Aid program that distributes funds annually to States for fish and wildlife restoration, boating access, hunter education, and related projects across America. The funds come from Federal excise taxes on fishing, hunting, and boating equipment.

Endangered Species Program

Through the Endangered Species Program, the Service consults with other federal agencies concerning their program activities and their effects on endangered and threatened species. Other Service activities under the Endangered Species Program include the listing of rare species under the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended: 16 U.S.C. 1531 et seq.) and the recovery of listed species. Once listed, a species is afforded the full range of protections available under the ESA, including prohibitions on killing, harming or otherwise taking a species. In some instances, species listing can be avoided by the development of Candidate Conservation Agreements, which may remove threats facing the candidate species, and funding efforts such as the Private Stewardship Grant Program. The federally endangered gray bat (*Myotis grisescens*) and Indiana bat (*Myotis sodalis*), as well as numerous federally endangered mussel species, occur in the Big South Fork Cumberland River Watershed.

On August 31, 2004, the Service designated critical habitat (Federal Register Volume 69, No. 168) in the Big South Fork Cumberland River Watershed for the federally endangered Cumberland elktoe (*Alasmidonta atropurpurea*), Cumberlandian combshell (*Epioblasma brevidens*), purple bean (*Villosa perpurpurea*), rough rabbitsfoot (*Quadrula cylindrical strigillata*), and oyster mussel (*Epioblasma capsaeformis*). This designation encompasses 95 river miles and consists of the following stream reaches: 27 river miles of the Big South Fork of the Cumberland River main stem from its confluence with Laurel Crossing Branch downstream of Big Shoals, McCreary County, Kentucky, upstream to its confluence with the New River and Clear Fork, Scott County, Tennessee; 7 river miles of North White Oak Creek from its confluence with the Big South Fork upstream to Panther Branch, Fentress County, Tennessee; 9.0 river miles of the New River from its confluence with Clear Fork upstream to U.S. Highway 27, Scott County, Tennessee; 25 river miles of Clear Fork from its confluence with the New River upstream to its confluence with North Prong Clear Fork, Morgan and Fentress Counties, Tennessee; 6 river miles of White Oak Creek from its confluence with Clear Fork upstream to its confluence with Bone Camp Creek, Morgan County, Tennessee; 4 river miles of Bone Camp Creek from its confluence with White Oak Creek upstream to Massengale Branch, Morgan County, Tennessee; 9.0 river miles of Crooked Creek from its confluence with Clear Fork upstream to Buttermilk Branch, Fentress County, Tennessee; and 9 river miles of North Prong Clear Fork from its confluence with Clear Fork upstream to Shoal Creek, Fentress County, Tennessee.

The main stem of the Big South Fork currently supports the best remaining Cumberlandian combshell population in the Cumberland River. For a complete listing of endangered and threatened species in Tennessee, please visit the Service's website at http://cookeville.fws.gov.

Recovery is the process by which the decline of an endangered or threatened species is stopped and reversed, and threats to the species' survival are eliminated, so that long-term survival in nature can be ensured. The goal of the recovery process is to restore listed species to a point where they are secure and self-sustaining in the wild and can be removed from the endangered species list. Under the ESA, the Service and National Marine Fisheries Service were delegated the responsibility of carrying out the recovery program for all listed species.

In a partnership with the Tennessee Chapter of The Nature Conservancy (TNC), Tennessee Wildlife Resource Agency (TWRA), and Tennessee Department of Environment and Conservation (TDEC) Division of Natural Heritage, the Service developed a State Conservation Agreement for Cave Dependent Species in Tennessee (SCA). The SCA targets unlisted but rare species and protects these species through a suite of proactive conservation agreements. The goal is to preclude the need to list these species under the ESA. This agreement covers middle and eastern Tennessee and will benefit water quality in many watersheds within the State.

In an effort to preclude the listing of a rare species, the Service engages in proactive conservation efforts for unlisted species. The program covers not only formal candidates but other rare species that are under threat. Early intervention preserves management options and minimizes the cost of recovery.

Partners for Fish and Wildlife Program

The U.S. Fish and Wildlife Service established the Partners for Fish and Wildlife Program to restore historic habitat types which benefit native fishes and wildlife. The program adheres to the concept that restoring or enhancing habitats such as wetlands or other unique habitat types will substantially benefit federal trust species on private lands by providing food and cover or other essential needs. Federal trust species include threatened and endangered species, as well as migratory birds (e.g. waterfowl, wading birds, shorebirds, neotropical migratory songbirds).

Participation is voluntary and various types of projects are available. Projects include livestock exclusion fencing, alternate water supply construction, streambank stabilization, restoration of native vegetation, wetland restoration/enhancement, riparian zone reforestation, and restoration of in-stream aquatic habitats.

HOW TO PARTICIPATE ...

- Interested landowners contact a Partners for Fish and Wildlife Biologist to discuss the proposed project and establish a site visit.
- A visit to the site is then used to determine which activities the landowner desires and how those activities will enhance habitat for trust resources. Technical advice on proposed activities is provided by the Service, as appropriate.
- Proposed cost estimates are discussed by the Service and landowner.
- A detailed proposal which describes the proposed activities is developed by the Service biologist and the landowner. Funds are competitive, therefore the proposal is submitted to the Service's Ecosystem team for ranking and then to the Regional Office for funding.
- After funding is approved, the landowner and the Service co-sign a Wildlife Extension Agreement (minimum 10-year duration).
- Project installation begins.
- When the project is completed, the Service reimburses the landowner after receipts and other documentation are submitted according to the Wildlife Extension Agreement.

For more information regarding the Endangered Species and Partners for Fish and Wildlife programs, please contact the Cookeville Ecological Services Field Office at 931/528-6481 or visit their website at http://*cookeville.fws.gov*.

5.2.D. National Park Service.

Aquatic resources in the Big South Fork National River and Recreation Area in relation to the Geologic Environment

The surface water resources of the Big South Fork National River and Recreation Area (BISO) are the single most important resource of the park. The conservation of the water resources, preservation of rare and endangered aquatic biota, recreational use of the Big South Fork of the Cumberland River, and economical development of the area are established in the enabling legislature of the Big South Fork National River and Recreation Area and all are dependent on maintaining high quality of surface water in the Big South Fork and tributaries. The water quality of tributary streams has been impacted by land use practices in the watershed. The effect of the impact has not been fully defined, but the decrease in water quality of the tributary streams can directly impact the Big South Fork and adversely affect the conditions that make the area unique.

Drainage of the Plateau is characteristically dendritic in pattern. Major drainage systems of the Plateau may be divided into two principal groups, consisting of those that are tributary to the Cumberland River system and those that are tributary to the Tennessee River system. The Cumberland River tributaries include the Caney Fork, Obey, Wolf, Big South Fork, and Elk Rivers as well as Jellico Creek. Those of the Tennessee River include the Tennessee, Sequatchie, Emory, Clinch, and Elk Rivers as well as Battle Creek (Ferguson and Pace 1981: 3). Several of these drainages actually drain relatively small portions of the Plateau. However, the Emory, Big South Fork, and Caney Fork Rivers drain in excess of 20% of the area defined, a combined total area of over 7000 square kilometers. The drainage of the Big South Fork of the Cumberland River contains approximately 3200 square kilometers of the Plateau or roughly 24% of the total area defined within the study unit. Dissecting the plateau are numerous deep gorges that form prominent cliffs along their perimeters.

The Cumberland Plateau aquifer system consists of Pennsylvanian sandstones, conglomerates, shales, and coals which underlie the Cumberland Plateau in Tennessee. Major water-bearing zones occur within the sandstones and conglomerates in interconnected fractures. The water-bearing formations are separated by shale and siltstone that retard the vertical circulation of ground water. The Pennington Formation serves as the base of this aquifer system and is an effective confining unit.

The Cumberland Plateau aquifer system is an important water source for the Cumberland Plateau. Wells and springs from the aquifer system supply most of the rural domestic and public drinking-water supplies. Water from wells drilled into the Cumberland Plateau aquifer system is generally of good to excellent quality.

One of the world’s richest assemblages of temperate freshwater fish once inhabited the Cumberland River (Starnes and Etnier, 1986) into which the Big South Fork River flows. However, impoundment and coal-mining related impacts have made the Cumberland River one of the Nation’s most severely altered river systems (Tennessee Valley Authority, 1971).

The Big South Fork region has been extensively mined for coal since the turn of the century with some mines still operating today in the Big South Fork watershed. These mining activities created at least 120 underground entries within the BISO that are clustered along the various coal seam outcroppings in the steep slopes of the Big South Fork gorge. The waste materials from these mines were generally deposited in uncontrolled dumps near the mines (Muncy and Buckner, 1985). Surface and ground water that comes in contact with these mine spoils or discharges directly from the mines is often acidic and commonly has elevated concentrations of iron, manganese, aluminum, and zinc. Many of the tributaries to the Big South Fork have these sources of contaminated mine drainage (CMD) within their watersheds.

Many aquatic species that once existed throughout major portions of the Cumberland River now exist only as isolated remnant populations (Neves and Angermeier, 1990). Eight fish and 24 mussel species in the Cumberland River basin are listed as endangered species, and numerous other aquatic species are currently considered candidates for Federal listing as endangered species. CMD into the Big South Fork River is partly responsible for the reduction in lotic and benthic diversity in the Big South Fork River. There are also over 300 oil and gas wells in the park's boundary. Oil and gas operations that discharge salt water to nearby streams cause the most degradation to water quality.

The tributary streams of the Tennessee and Cumberland River basins contain freshwater mussel species that are endemic to the southern Appalachian Mountains and the Cumberland Plateau region. Ortmann referred to these species as "Cumberlandian," and this region became known as one of the chief centers of freshwater mussel speciation. Ortmann (1924) defined the Cumberlandian region to include the drainages of the Tennessee River system from the headwaters to the vicinity of Muscle Shoals, in Colbert and Lauderdale Counties, Alabama; and the Cumberland River system from the headwaters to the vicinity of Clarksville, Montgomery County, Tennessee (Ortmann, 1925). Of the 90 species of unionids found in the Tennessee River, 37 are Cumberlandian, as are 27 of the 78 species found in the Cumberland River. These two assemblages contain the largest number of unionid species found in any of the world's rivers (Johnson, 1980). Of the 23 American freshwater mussel species listed as endangered by the U.S. Department of Interior, 13 are members of the Cumberlandian faunal group.

Unfortunately, the high diversity has translated into a high proportion of imperiled species. The Cumberlandian Region has the dubious distinction of having by far the highest number of imperiled mussels of any major region in the country (NatureServe 1998). Currently, 34 mussels known from the region are federally protected under the Endangered Species Act (Act). At least an additional 36 mussels are considered globally imperiled (Williams et al. 1993). Thirteen species known from the region are now considered to be extinct (Turgeon et al. 1998). Numbers of imperiled mussels continue to increase with the ongoing decline of faunal elements and their habitats. Dozens of major impoundments, episodic and chronic chemical spills, channelization, and sedimentation have contributed to the demise of this extraordinary fauna (Williams et al. 1993, Parmalee and Bogan 1998).

Historically, as many as 71 mussel species were present in BISO and currently only 26 species have been found. Funded projects will transfer remnant populations of these species found outside of the park, but in marginal habitats, to the more suitable habitat in BISO and restore them to the park. Additionally, our partners operate artificial propagation programs and will donate help to augment natural reproduction. This effort is consistent with National Park Service (NPS) Management Policies (2001) to restore extirpated native species and recover all endangered species that belong in a park unit. Management policies 2001 states, in part: "Undertake active management to restore and maintain listed species, and re-establish extirpated populations as necessary to maintain species and habitats upon which they depend" (section 4.4.2.3). Recently the state wildlife agency discovered remnant populations of extirpated mussels existing below tailwaters from impoundments along the Cumberland River. These specimens were in a state of very cold existence, alive, not feeding very much and not reproducing. When the specimens were brought out to normal conditions, they began breeding and otherwise behaving normally. This condition describes poikiotherms, animals whose body temperature are subject to the various outside temperatures. Gametogenisis is not occurring in the animals that are below the outfall of impoundments because the temperature is too low. These animals thrive in free-flowing rivers. Four endangered species that were extirpated from the park are in these mussel beds. The state wildlife agency has no where to put these organisms with suitable habitat, except the middle reaches of BISO on the main river. This project proposes to restore the native fauna that was extirpated by harvesting the stranded specimens, and propagating them. We will also propagate the endangered species currently existing in the park. An E.A. with a FONSI was prepared with an approved plan to re-introduce the 45 species that were once present at BISO. This document presents a proposal to restore the mussel fauna of the free-flowing reach of the Big South Fork of the Cumberland River (BSF) in BISO, Morgan, Scott, and Fentress Counties in north-central Tennessee, and McCreary County in southeastern Kentucky. Specifically, the following actions are proposed (1) augment existing populations of six federally listed mussels--Cumberland bean (*Villosa trabalis*), Cumberlandian combshell (*Epioblasma brevidens*), oyster mussel (*E. capsaeformis*) , tan riffleshell (*E. walkeri*), little-wing pearlymussel (*Pegias fabula*), and Cumberlandian elktoe (*Alasmidonta atropurpurea*, (2) reintroduce historical populations of four federally listed mussels--clubshell (*Pleurobema clava*), cracking pearlymussel (*Hemistena lata*), dromedary pearlymussel (*Dromus dromas*), and orangefoot pimpleback (*Plethobasus cooperianus*). The proposed actions for the federally listed mussels are: (1) consistent with the purposes of the 1973 Endangered Species Act, as amended (Act), (2) compatible with the goal of the 1916 National Park Service Organic Act, and (3) identified as tasks in the U.S. Fish and Wildlife Services (FWS) approved recovery plans for these species. It is unlikely that these federally listed species can be reclassified from endangered to threatened or recovered and removed from the Acts protection without augmenting and expanding existing populations and reestablishing populations back into historical habitats like the BSF. Similar efforts for these and other federally listed, candidate, and non-listed mussels are underway in other southeastern river systems. This work will can be done in three years.

A recent status review of the 297 mussel species in the United States has revealed significant nationwide declines. A profound increase in federal listings of threatened and endangered species has occurred in recent years. Approximately 25 percent of the mussel fauna are now federally listed and 12 percent are extinct. No other group of animals in the United States approaches this level of imperilment. For a regional perspective, it is readily apparent that the rain forest of mussel diversity is in the southeastern United States, which includes the Cumberland and Tennessee River systems. Of the 129 freshwater mussel species in the Tennessee and Cumberland Rivers, 40 species are federally protected. Mussels are sensitive to physical or chemical changes in habitat suitability, and are among the first to disappear under anthropogenic disturbance. Their presence and expanded populations offer opportunities to ecologically improve aquatic river systems (e. g., water quality and food webs) so that species can be recovered to the point of delisting from the federal list of endangered species. Big South Fork mussels are brood stock for these efforts. Their loss would eliminate all mussel recovery efforts for these species in the Cumberland River system.

North America's freshwater mussel fauna, particularly the fauna in the southeastern United States, is globally significant (Neves et al. 1997). T.A. Conrad wrote in a paper presented to the Academy of Natural Sciences of Philadelphia in 1834: "The great variety and beauty of the fresh water shells of this country are truly surprising. Whilst the streams of Europe contain very few species, not remarkable for elegance of color or variety, the rivers of Ohio, Kentucky, Tennessee, Alabama, etc., contain at least one hundred species of almost every imaginable shape."
Of the 297 mussel species known from U.S. waters, over 90 percent occur in the Southeast (Williams et al. 1993). Currently, nearly 25 percent of the Southeast's mussel fauna are federally listed and about 12 percent are extinct. No other native faunal group approaches this level of imperilment.

The States of Virginia and Tennessee, in cooperation with the FWS and the U.S. Geological Survey (USGS), have been actively pursuing mussel life history studies and developing mussel propagation and reintroduction technology for nearly 20 years with the aim of recovering this fauna. Progress in these research areas has been successful in recent years (e.g., fish hosts have been identified, endangered mussels have been reared in captivity and used to augment existing populations, non-endangered mussels have been successfully reintroduced and have reproduced in historical habitat). Additionally, through the efforts of the National Park Service (NPS), Environmental Protection Agency, State water resources and natural resources agencies, non-governmental conservation organizations (e.g., The Nature Conservancy, World Wildlife Fund, and local watershed restoration groups), industry, and municipalities, some rivers and river reaches that once supported a diverse mussel fauna have been restored sufficiently to again support mussels. Thus, the FWS and its many partners are poised to implement a major mussel recovery effort.

On February 26, 2001, representatives of several agencies [Tennessee Wildlife Resources Agency, Tennessee Department of Environment and Conservation, Kentucky Department of Fish and Wildlife Resources, Kentucky Division of Water, Kentucky State Nature Preserves Commission, FWS (Asheville, North Carolina and Cookeville, Tennessee field offices), USGS, and NPS (BISO and Obed Wild and Scenic River)] met at BISO headquarters, Oneida, Tennessee, to address restoring BSF's mussel biodiversity. All agencies represented supported the concept of initiating mussel recovery efforts in the BISO.

Currently, 26 species remain in the National Area including six that are federally protected --Cumberland elktoe (*Alasmidonta atropurpurea*), Cumberlandian combshell (*Epioblasma brevidens*), Cumberland bean pearlymussel (*Villosa trabalis*), oyster mussel (*Epioblasma capsaeformis*)[1], tan riffleshell (*Epioblasma walkeri*)[2], and little-wing pearlymussel (*Pegias fabula*). Although the decline is considerable, recent mussel surveys indicate that the river is slowly recovering [Ahlstedt et al., 2003]. The river's recovery is also reflected in its fish fauna, which appears to be experiencing some degree of improvement (Dr. David Etnier, University of Tennessee, and Pat Rakes, Conservation Fisheries, Inc., personal communication 2001). Opportunities currently exist to begin recovering the mussel fauna in the Big South Fork and assist in the recovery of several federally endangered mussels.

Soils in the Plateau are chiefly formed from parent material and, consequently, are sandy loams that are fairly well drained. Silt loams and residual clays occur on slopes and valley floors. Loess of western origin is nearly absent from the region (USDA 1981:2).

The Cumberland Plateau falls within the Cumberland and Allegheny section of the Mixed Mesophytic Forest region. It is described as one of the oldest and most complex associations of the eastern deciduous forests. Where the region is deeply dissected, typical dominant species include tulip, poplar, white and red oak, hemlock, basswood, beech, chestnut, and sugar maple. The old peneplain surface is dominated by oak or oak-hickory forest (Braun 1950:39,114).

Because of its higher elevation, the region maintains a temperate climate with average temperatures lower than the adjacent regions. General weather conditions are subject to microclimatic variation between areas. The annual mean temperature is 55 degrees Fahrenheit in the northern Plateau and about 4 degrees higher in the south. Precipitation averages about 50 inches per year, much of it as rain occurring from late winter through early spring. Snowfall averages about 10 inches per year (Ferguson and Pace 1981:7-10). For more information, please visit the National Park Service website at: http://www.nps.gov/biso

5.2.E. United States Army Corps of Engineers-Nashville District. The Nashville District, U.S. Army Corps of Engineers is one of seven districts in the Lakes and Rivers Division. The district's area is determined by the Cumberland River and the Tennessee River's watersheds and encompasses 59,000 square miles in portions of seven states. This geographic area is represented by 14 senators and 20 Congressional representatives. The Nashville District's missions include providing flood protection, recreation, hydropower, and navigation. The District also provides environmental stewardship through our Regulatory and Civil Works programs, conducts emergency response to disasters, and to performs other authorized Civil Works projects.

[1]Both *Epioblasma capsaeformis* and *E. walkeri* have been reported from the Big South Fork, and the *Epioblasma* that currently exists in the Big South Fork shares characteristics with both species. Thus, because of taxonomic questions, it is unclear if it is one, both, or an undescribed species. DNA analysis is planned to help resolve this issue.

[2]See footnote 1.

Within the 18,000 square mile Cumberland River Basin, overall responsibilities for the Nashville District include operation and maintenance of 10 reservoir projects. Each of these is operated for some or all of the following purposes: hydropower production, flood control, navigation, water supply, water quality, fish and wildlife, and recreation.

Within the much larger, 41,000 square mile Tennessee River Basin the Nashville District operates a series of navigation locks and has regulatory permit authority over dredge and fill activities under the Clean Water Act and the Rivers and Harbors Act.

As of 2005, the District's flood control projects have prevented more than $1.96 billion in flood damages. The District also provides flood prevention planning assistance to the states and local governments.

Lakes in the Nashville District are the most popular in the nation. More than 36 million people visited our 10 lakes last year. These recreation users had an economic impact on the region of nearly $877 million dollars. Five Nashville District lakes rank among the top 25 in Corps-wide visitation. In 2000, the District's 70 commercial concessionaires produced $1.3 million in profit, and returned more than $300,000 to the U.S. Treasury in rent payments for leases.

The Nashville District has the capacity to produce more than 914 megawatts of clean electricity, enough to power the needs of a city the size of Nashville, at nine different hydropower generations plants in the Cumberland River Basin. The District generates about $44 million in revenue from the sale of this power annually. This revenue is returned to the U.S. Treasury.

The Nashville District operates and maintains 1,175 commercially navigable river miles; almost 10% of the total within the U.S. Army Corps of Engineers. The district operates and maintains 14 navigation lock projects; nine on the Tennessee River, four on the Cumberland River, and one on the Clinch River. There are more than 40,000 commercial and recreational lockages annually. More than 74 million tons of commodities passed through these 14 locks during 2005. Wilson Lock in Alabama has the highest single lift east of the Rocky Mountains, between 93 and 100 feet, depending on the current river water level.

Regulatory Program

The U.S. Army Corps of Engineers has been involved in regulating certain activities in the nation's water since 1890. Prior to 1968, the primary thrust for the regulatory program was the protection of navigation. As a result of new laws and judicial decisions, the program has evolved to one that considers the full public interest by balancing the favorable impacts against detrimental impacts. The Nashville District annually handles more than 3,000 regulatory actions, 97% of which were evaluated in less than 60 days.

Section 10 of the Rivers and Harbors Act of 1899 **-** requires approval prior to the accomplishment of any work in or over navigable waters of the United States, or which affects the course, location, condition or capacity of such waters. Typical activities requiring Section 10 permits are:

•Construction of piers, wharves, bulkheads, dolphins, marinas, ramps, and cable/pipeline crossings.
• Dredging and excavation

Section 404 of the Clean Water Act **-** requires approval prior to discharging dredged or fill material into the waters of the United States. Typical activities requiring Section 404 permits are:
• Depositing of fill or dredged material in waters of the U.S. or adjacent wetlands.
• Site development fill for residential, commercial, or recreational developments.
• Construction of revetments, groins, breakwaters, levees, dams, dikes, and weirs.
• Placement of riprap and road fills.

Civil Works Program

The Corps' ongoing Civil Works responsibilities date back to the early 1800's when Congress authorized the removal of navigation hazards and obstacles. Over the years, succeeding Administrations and Congresses have expanded the Corps' missions to include most all water-related planning, development, and construction areas where a Federal interest is involved. Funds for Congressionally Authorized Projects are provided through Energy and Water Appropriations Acts and through contributions from non-Federal entities for specific projects.

Civil Works projects may also be funded under the Continuing Authorities Program (CAP). Congress has provided the Corps with standing authorities to study and build specific water resources projects for specific purposes and with specified spending limits. CAP projects are usually implemented in a faster time frame, are limited in complexity, have Federal cost limits, are approved by the Division Commander, and do not need Congressional authorization.

Nashville District Corps of Engineers Water Quality Program

The Nashville District Corps of Engineers collects a significant volume of physical, chemical, and biological water quality data every year. These data are collected at representative points both within all ten Nashville District lakes, on various major and/or representative inflow streams, and in the tailwaters. Where there are known water quality problems, such as seasonal low DO in certain turbine releases, monitoring is significantly intensified to track and quantify a particular problem. This information is used to make informed decisions about how a project's powerplant should operate. Baseline, continuous recording, multiparameter water quality monitors keep track of conditions at critical points on the main stem of the Cumberland River from the mouth of the Obey River near Celina, Tennessee to the tailwater of Lake Barkley in western Kentucky. The monitor at the Old Hickory Dam tailwater, in particular, provides key information, since water discharged from Old Hickory must be able to absorb inputs from Nashville which is just downstream.

The data collected by the Nashville District are used to help determine watershed water quality trends and to provide for better management of the comprehensive reservoir system. The data are essential for running predictive water quality models, a growing trend in Corps' water management practice.

Additional information concerning projects, programs, and activities of the Nashville District Corps of Engineers can be obtained on the World Wide Web at http://www.orn.usace.army.mil/

Environmental Education

Environmental education opportunities are provided to area school age children by the Nashville District Corps of Engineers. Water Quality personnel have participated in environmental awareness programs for the past several years at the majority of Nashville District lakes. These programs are organized by the local lake Resource Management staff and involve various area schools. The programs provided allow students to have a "hands on" experience in water quality surveillance techniques. Typically the programs include an interactive discussion of overall water quality issues. This is supplemented with demonstrations of sophisticated water quality instrumentation, collection and analysis of biological specimens from local aquatic environments, and viewing of reference materials and preserved specimens. The value of such environmental education is enormous, because it reaches young people early in their lives and exposes them to a scientific learning experience that is impossible to duplicate in a formal classroom. This experience hopefully contributes to a greater lifelong awareness by the individual of the importance of conserving and improving water quality and wise use of water resources.

Additional Information

To obtain additional information about the District, please refer to the home page at:
http://www.lrn.usace.army.mil/, or contact the following offices:
Public Affairs Office (General Information): (615) 736-7161
Regulatory Branch: (615) 369-7500

5.3. STATE PARTNERSHIPS.

5.3.A. TDEC Division of Water Supply. The Source Water Protection Program, authorized by the 1996 Amendments to the Safe Drinking Water Act, outline a comprehensive plan to achieve maximum public health protection. According to the plan, it is essential that every community take these six steps:

1) Delineate the drinking water source protection area
2) Inventory known and potential sources of contamination within these areas
3) Determine the susceptibility of the water supply system to these contaminants
4) Notify and involve the public about threats identified in the contaminant source inventory and what they mean to their public water system
5) Implement management measures to prevent, reduce or eliminate threats
6) Develop contingency planning strategies to deal with water supply contamination or service interruption emergencies (including natural disaster or terrorist activities).

Source water protection has a simple objective: to prevent the pollution of the lakes, rivers, streams, and ground water (wells and springs) that serve as sources of drinking water before they become contaminated. This objective requires locating and addressing potential sources of contamination to these water supplies. There is a growing recognition that effective drinking water system management includes addressing the quality and protection of the water sources.

Source Water Protection has a significant link with the Watershed Management Program goals, objectives and management strategies. Watershed Management looks at the health of the watershed as a whole in areas of discharge permitting, monitoring and protection. That same protection is important to protecting drinking water as well. Communication and coordination with a multitude of agencies is the most critical factor in the success of both Watershed Management and Source Water Protection.

Watershed management plays a role in the protection of both ground water and surface water systems. Watershed Management is particularly important in areas with karst (limestone characterized by solution features such as caves and sinkholes as well as disappearing streams and spring), since the differentiation between ground water and surface water is sometimes nearly impossible. What is surface water can become ground water in the distance of a few feet and vice versa.

Source water protection is not a new concept, but an expansion of existing wellhead protection measures for public water systems relying on ground water to now include surface water. This approach became a national priority, backed by federal funding, when the Safe Drinking Water Act amendments (SDWA) of 1996 were enacted. Under this Act, every public drinking water system in the country is scheduled to receive an assessment of both the sources of potential contamination to its water source of the threat these sources may pose by the year 2003 (extensions were available until 2004). The assessments are intended to enhance the protection of drinking water supplies within existing programs at the federal, state and local levels. Source water assessments were mandated and funded by Congress. Source water protection will be left up to the individual states and local governments without additional authority from Congress for that progression.

Tennessee's Wellhead Protection Rules were revised as of October 29, 2005 to include requirements for similar protection for public water systems using surface water sources under the heading of Drinking Water Source Protection Rule (1200-5-1-.34) in addition to the previous requirements for wellhead protection for public water systems using ground water sources. The rule addresses surface or ground water withdrawals in the vicinity of public water sources as well as potential contaminant sources threatening public water sources to reflect the amended prohibitions in the 2002 Amendments to the Tennessee Safe Drinking Water Act, TCA 68-221-771. There are additional reporting requirements of potential contaminant source inventories and emergency response for the public water systems as well. The Division of Water Supply will be able to use the Drinking Water Source Protection Rule to work in complimentary fashion with the Division of Water Pollution Control and other Departmental agencies in activities to protect public water sources.

As a part of the Source Water Assessment Program, public water systems are evaluated for their susceptibility to contamination. These individual source water assessments with susceptibility analyses are available to the public at http://www.state.tn.us/environment/dws as well as other information regarding the Source Water Assessment Program and public water systems.

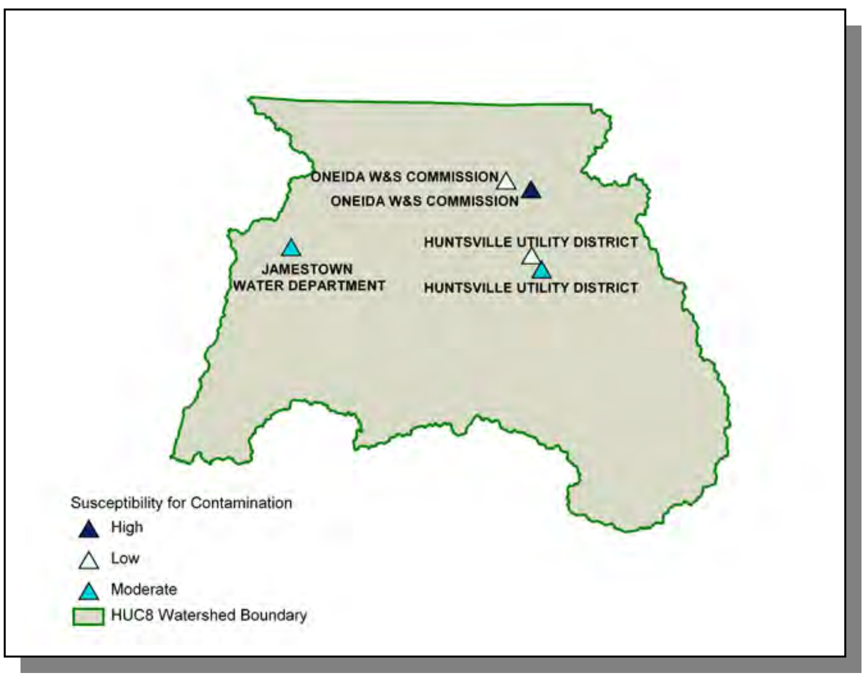

Figure 5-1. Susceptibility for Contamination in the South Fork Cumberland River Watershed.

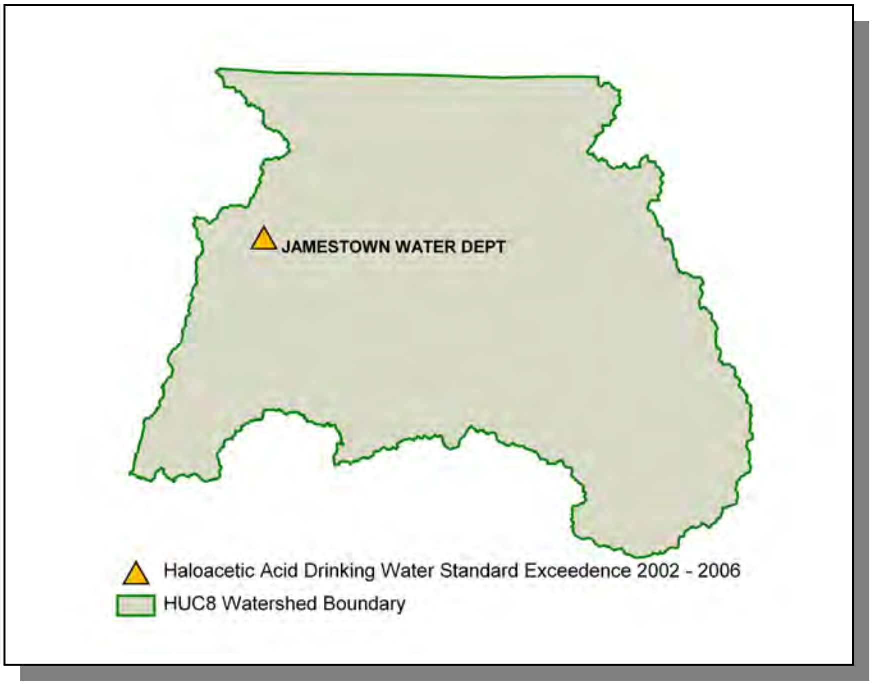

Figure 5-2. Exceedences of the Haloacetic Acid Drinking Water Standard in the South Fork Cumberland River Watershed.

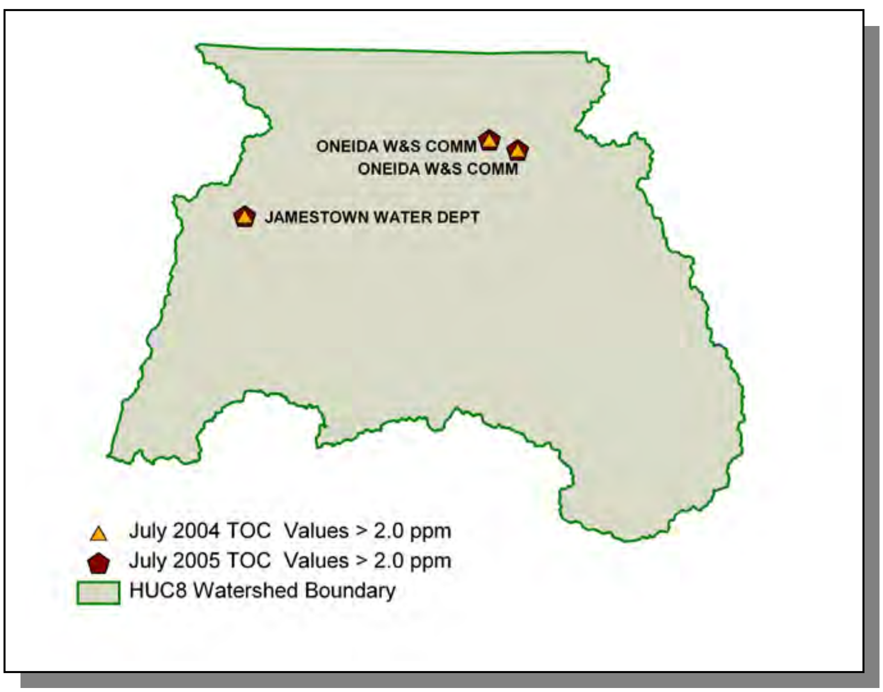

Figure 5-3. July 2004 and 2005 Raw Water Total Organic Carbon (TOC) Analysis in the South Fork Cumberland River Watershed.

For further discussion on ground water issues in Tennessee, the reader is referred to the Ground Water Section of the 305(b) Water Quality Report at http://www.tdec.net/water.shtml.

5.3.B. State Revolving Fund. TDEC administers the state's Clean Water State Revolving Fund Program. Amendment of the Federal Clean Water Act in 1987 created the Clean Water State Revolving Fund (SRF) Program to provide low-interest loans to cities, counties, and utility districts for the planning, design, and construction of wastewater facilities. The U.S. Environmental Protection Agency awards annual capitalization grants to fund the program and the State of Tennessee provides a twenty-percent funding match. TDEC has awarded loans totaling approximately $550 million since the creation of the SRF Program. SRF loan repayments are returned to the program and used to fund future SRF loans.

SRF loans are available for planning, design, and construction of wastewater facilities, or any combination thereof. Eligible projects include new construction or upgrading/expansion of existing facilities, including wastewater treatment plants, pump stations, force mains, collector sewers, interceptors, elimination of combined sewer overflows, and nonpoint source pollution remedies.

SRF loan applicants must pledge security for loan repayment, agree to adjust user rates as needed to cover debt service and fund depreciation, and maintain financial records that follow governmental accounting standards. SRF loan interest rates range from zero percent to market rate, depending on the community's per-capita income, taxable sales, and taxable property values. Most SRF loan recipients qualify for interest rates between 2 and 4 percent. Interest rates are fixed for the life of the term of the loan. The maximum loan term is 20 years or the design life of the proposed wastewater facility, whichever is shorter.

TDEC maintains a Priority Ranking System and Priority List for funding the planning, design, and construction of wastewater facilities. The Priority Ranking List forms the basis for funding eligibility determinations and allocation of Clean Water SRF loans. Each project's priority rank is generated from specific priority ranking criteria and the proposed project is then placed on the Project Priority List. Only projects identified on the Project Priority List may be eligible for SRF loans. The process of being placed on the Project Priority List must be initiated by a written request from the potential SRF loan recipient or their engineering consultant. SRF loans are awarded to the highest priority projects that have met SRF technical, financial, and administrative requirements and are ready to proceed.

Since SRF loans include federal funds, each project requires development of a Facilities Plan, an environmental review, opportunities for minority and women business participation, a State-approved sewer use ordinance and Plan of Operation, and interim construction inspections.

For further information about Tennessee's Clean Water SRF Loan Program, call (615) 532-0445 or visit their Web site at http://www.tdec.net/srf.

5.3.C. Tennessee Department of Agriculture. The Tennessee Department of Agriculture's Water Resources Section consists of the federal Section 319 Nonpoint Source Program and the Agricultural Resources Conservation Fund Program. Both of these are grant programs which award funds to various agencies, non-profit organizations, and universities that undertake projects to improve the quality of Tennessee's waters and/or educate citizens about the many problems and solutions to water pollution. Both programs fund projects associated with what is commonly known as "nonpoint source pollution."

The Tennessee Department of Agriculture's Nonpoint Source Program (TDA-NPS) has the responsibility for management of the federal Nonpoint Source Program, funded by the US Environmental Protection Agency through the authority of Section 319 of the Clean Water Act. This program was created in 1987 as part of the reauthorization of the Clean Water Act, and it established funding for states, territories and Indian tribes to address NPS pollution. Nonpoint source funding is used for installing Best Management Practices (BMPs) to stop known sources of NPS pollution, training, education, demonstrations and water quality monitoring. The TDA-NPS Program is a non-regulatory program, promoting voluntary, incentive-based solutions to NPS problems. The TDA-NPS Program basically funds three types of programs:

- BMP Implementation Projects. These projects aid in the improvement of an impaired waterbody, or prevent a non-impaired water from becoming listed on the 303(d) List.
- Monitoring Projects. Up to 20% of the available grant funds are used to assist the water quality monitoring efforts in Tennessee streams, both in the state's 5-year watershed monitoring program, and also in performing before-and-after BMP installation, so that water quality improvements can be verified. Some monitoring in the South Fork Cumberland River Watershed was funded under an agreement with the Tennessee Department of Agriculture, Nonpoint Source Program (U.S. Environmental Protection Agency Assistance Agreement C99944674-04-0).

- Educational Projects. The intent of educational projects funded through TDA-NPS is to raise the awareness of landowners and other citizens about practical actions that can be taken to eliminate nonpoint sources of pollution to the waters of Tennessee.

The Tennessee Department of Agriculture Agricultural Resources Conservation Fund Program (TDA-ARCF) provides cost-share assistance to landowners across Tennessee to install BMPs that eliminate agricultural nonpoint source pollution. This assistance is provided through Soil Conservation Districts, Resource Conservation and Development Districts, Watershed Districts, universities, and other groups. Additionally, a portion of the TDA-ARCF is used to implement information and education projects statewide, with the focus on landowners, producers, and managers of Tennessee farms and forests.

Participating contractors in the program are encouraged to develop a watershed emphasis for their individual areas of responsibility, focusing on waters listed on the Tennessee 303(d) List as being impaired by agriculture. Current guidelines for the TDA-ARCF are available. Landowners can receive up to 75% of the cost of the BMP as a reimbursement.

Since January of 1999, the Department of Agriculture and the Department of Environment and Conservation have had a Memorandum of Agreement whereby complaints received by TDEC concerning agriculture or silviculture projects would be forwarded to TDA for investigation and possible correction. Should TDA be unable to obtain correction, they would assist TDEC in the enforcement against the violator. More information forestry BMPs is available at:

http://www.state.tn.us/agriculture/forestry/bmpmanual.html

The complaint form is available at:

http://www.state.tn.us/environment/wpc/forms/wqlogging_cn1274.doc

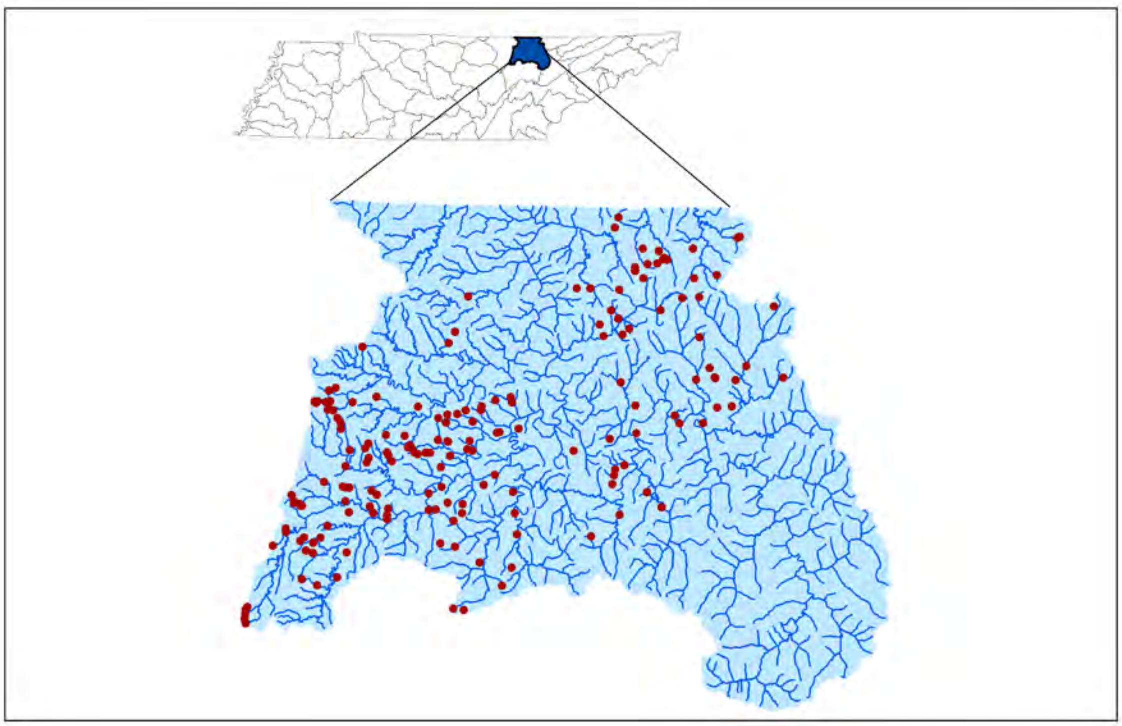

Figure 5-4. Location of BMPs installed from 1999 through 2005 in the Tennessee Portion of the South Fork Cumberland River Watershed with Financial Assistance from the Tennessee Department of Agriculture's Nonpoint Source and Agricultural Resources Conservation Fund Grant Programs. *More information is provided in Appendix V.*

5.3.D. Kentucky Division of Water – Kentucky Watershed Management Framework. The Kentucky Watershed Management Framework is a dynamic, flexible structure for coordinating watershed management across the Commonwealth of Kentucky.

The Watershed Management Framework is not a new program, but rather a way of coordinating existing programs and building new partnerships that will result in more effective and efficient management of the state's land and water resources. Inherent in the design of the Framework is the belief that many stakeholder groups and individuals must have ongoing opportunities to participate in the process of managing the abundant natural resources that characterize Kentucky's watersheds.

Benefits to the people of Kentucky include:

- Better information for decision making
- Increased ability to resolve complex water resource problems
- Improved coordination among governmental agencies
- More opportunities for citizens to get involved
- Increased ability to demonstrate results and benefits of environmental management
- More cost-effective use of public and private funds

Each major river basin in Kentucky is staffed with a Basin Coordinator. Basin Coordinators are staff assigned to serve as a liaison in a given basin management unit among the agencies, the local interests, and the resources concerns. Their job is to specialize in their watershed, to know what resources might be available to address the concerns, and facilitate the watershed process to implement plans that address the problems.

For more information about the KY Watershed Management Framework visit our website at http://www.watersheds.ky.gov/

Watershed Framework activities in the Big South Fork watershed are coordinated through the Upper Cumberland River Basin Team. The Upper Cumberland River Basin Team is a multi-agency task force that meets regularly to help in development of monitoring strategies, education and outreach, prioritization of issues and watersheds within the basin, planning, and networking among technical staff and local leaders to apply agency resources to implement fixes. For more info about the Upper Cumberland River Basin Team contact Rob Miller, Upper Cumberland River Basin Coordinator at (606) 878-0157 or via email at robert.l.miller@ky.gov. The web address is http://www.watersheds.ky.gov/basins/upper_cumberland/.

Big South Fork of Cumberland River

Big South Fork, below Bear Creek (05130104250)
Big South Fork above Bear Creek (05130104220)
Bear Creek, of Big South Fork (05130104240)
Rock Creek (05130104290)
Roaring Paunch Creek (05130104270)
Little South Fork (05130104310)
Sinking Creek of Big South Fork (05130104320)
Cedar Sinking Creek (05130104330)

Geography. The Big South Fork watershed in Kentucky is comprised of more than 400 square miles. The Big South Fork arises in north central Tennessee and flows northward into McCreary County. Along much of this flow the river cuts deep into the Pottsville Escarpment region of the Cumberland Plateau forming a 600-foot deep gorge. The river eventually joins the Cumberland River at Lake Cumberland near Burnside. The general topography is steep with high ridges and low hollows. The terrain is well-dissected and well-drained by deeply entrenched streams. Ridges are generally narrow and winding. Natural flat land is mainly restricted to flood plains of the main stem and major tributaries. Low-order streams are generally V-shaped and have no flood plains. The escarpment region is a transitional zone between the Cumberland Plateau and the Mississippian Plateau. Resistant sandstone and conglomerate have weathered to create sheer cliffs, steep-walled gorges, rock shelters, waterfalls, natural bridges and arches. The deepest sections of the gorge are located in Tennessee however much of the terrain in Kentucky is equally as treacherous with narrow ridges dropping off steep cliff lines to the river valley below. As the stream nears Lake Cumberland the cliff lines diminish to steep hillsides. In the northwest portion of the watershed the valleys contain significant karst drainage areas.

Waterways. There are about 800 miles of streams in the Kentucky portion of the watershed. Major tributaries include Roaring Paunch Creek, Bear Creek, Rock Creek, Cedar Sinking Creek, Sinking Creek, and Little South Fork, Cooper Creek, Alum Creek, Big Creek, Koger Creek, Wolf Creek and Lick Creek, Oil Well Branch, Troublesome Creek and Difficulty Creek.The lower section of the river below Yamacraw is inundated by the backwater of Lake Cumberland much of the year.

A 10.2- mile segment of the Big South Fork above Roaring Paunch Creek is Outstanding National Resource Water due to the presence of federally endangered Cumberland Bean mussel (*Villosa trabalis*), Cumberland Elktoe mussel (*Alasmidonta atropurpurea*) and the Duskytail Darter (*Etheostoma percnurum*).

Rock Creek from White Oak Creek to the state line is Outstanding State Resource Water due to the presence of federally endangered Cumberland Elktoe mussel (*Alasmidonta atropurpurea*). In addition, this same segment is designated as a State Wild River.

There are 10.4 miles of the main stem of the Little South Fork designated as State Wild River. The stream is also Outstanding State Resource Water due to the presence of the Cumberland Bean mussel (*Villosa trabalis*).

The entire watershed upstream of Big Creek is part of the Source Water Protection Area for McCreary County Water District.

Land cover\land use. The entire stretch of the main stem above Koger Creek is within the Big South Fork National River and Recreation Area. Also the majority of the watershed falls within the Daniel Boone National Forest proclamation boundary with a large portion of the land in Forest Service ownership. In addition, 8700 acres of the lower watershed are part of the Lake Cumberland Wildlife Management Area. Because much of the land is not privately owned, the watershed is not densely populated. Exceptions to this would be along the US 27 highway corridor and near the towns of Whitley City and Stearns. The watershed is covered with mostly mixed forest with some patches of deciduous or evergreen forest. There are several areas throughout the watershed that are reclaimed from historical surface mining.

Agency Data Assessment. During the 2000 water quality assessment the following stream reaches were assessed.

- A 5.6-mile segment of the Big South Fork downstream of Bear Creek was assessed for fish, macroinvertebrates, algae and water quality. The segment was judged fully supporting for aquatic life.
- The Copperas Fork tributary was assessed for macroinvertebrates and was judged not supporting for aquatic life and primary contact recreation.
- A 5.6-mile segment from Bear Creek to the Tennessee state line was assessed for fish, macroinvertebrates and algae. The segment was judged fully supporting for aquatic life.
- Difficulty Creek was assessed for fish and judged fully supporting for aquatic life.
- The lower 3.2 miles of Bear Creek were assessed for fish and macroinvertebrates. The segment was judged not supporting for aquatic life.
- The lower 7.8 miles of Roaring Paunch were assessed for fish, macroinvertebrates, and algae. The segment was judged fully supporting for aquatic life.
- Coffey Branch was assessed for macroinvertebrates and was judged fully supporting for aquatic life.
- The main stem of Rock Creek was assessed in three segments for a total of 16.4 miles. The lowermost segment is 4.1 miles long and was assessed for fish, macroinvertebrates and algae. This segment was judged partially supporting for aquatic life. The next segment is 7.0 miles long and was assessed for fish and macroinvertebrates. This segment was judged fully supporting for aquatic life. The uppermost segment was assessed for fish, macroinvertebrates, algae and fish tissue. This segment was judged fully supporting for aquatic life but only partially supporting for fish tissue consumption due to mercury.
- Puncheoncamp Branch and Watts Branch were assessed and judged fully supporting for aquatic life.
- The Little South Fork was assessed in three segments for a total of 22.5 miles. All three segments were judged fully supporting for aquatic life. One segment was also assessed for fish tissue and was judged fully supporting for fish tissue consumption.

Watershed Efforts in the Big South Fork. Although no subwatersheds in the Big South Fork were selected by the Upper Cumberland River Basin Team as a priority watershed for watershed planning, it has none the less been a focus of numerous projects. Several factors including strong local interest in source water protection, two State Wild Rivers, numerous endangered species and natural beauty have played a major role.

- **Rock Creek Task Force –** Multi-agency task force created to address acid mine drainage problems in lower Rock Creek watershed. The task force acquired funding from several sources including EPA Clean Water Action Plan funds, Appalachian Clean Streams Initiative, East Kentucky PRIDE and Trout Unlimited. For more info about the project http://www.aml.ky.gov/projects/Rock_Creek.htm

- **Source Water Assessment for McCreary County Water District -** Conducted as a follow up to state efforts for source water assessment. Partnership between McCreary County Water District, Western Kentucky University and Kentucky Rural Water Association. Water District recently received EPA 319h funding for development of watershed based plans in three subwatersheds of the Big South Fork.
- **Big South Fork Watershed Association -** Development of joint state watershed association.
- **Upper Cumberland Watershed Watch -** Through the recruiting efforts of the Big South Fork Watershed Association and the McCreary County Water District the Upper Cumberland Watershed Watch now has more than a dozen active volunteer samplers in the Big South Fork watershed. The samplers are scattered across the watershed in both Kentucky and Tennessee.
- **Joint Kentucky/Tennessee Water Quality Project** – The Big South Fork watershed was identified as a priority area for both states to work together on source water protection.

5.4. LOCAL INITIATIVES.

5.4.A. The South Fork Watershed Association. The South Fork Watershed Association (SFWA) is a bi-state collaboration of federal, state and local agencies, as well as community involved citizens. The SFWA is in the process filing for a TN Charter and 501(c)(3) nonprofit IRS status.

The SFWA's mission

(1) To enhance the long term attractiveness and health of the South Fork Watershed by appropriate voluntary citizen action through:

(A) Promoting exchange of information on the Watershed resources.

(B) Educating residents, tourists, businesses, developers, and government agencies in the South Fork Watershed:

1) To preserve or improve water quality;
2) To recognize land use practices which negatively impact the watershed, and to avoid pollution of all kinds;
3) To protect and encourage wildlife, native fish populations, and riparian habitat;
4) To foster recreational use of parks and waterways;
5) To promote integrated development planning;
6) To encourage sustainable land and resource use; and
7) To promote the long term sustainability of water resources for drinking water and public health.

(C) Promoting cooperation between residents, businesses, developers, government agencies, social associations and educators which will diminish conflict over use or development of natural resources that could harm the watershed.

(D) Encouraging and facilitating research and studies which will provide information on potential risks to the watershed or sustainable development opportunities for Watershed users.

The SFWA is active with a number of project activities. The group is working to study the watershed and develop a source water protection plan for community drinking water. This watershed planning project is made possible by a grant from the TENNESSEE Department of Agriculture Nonpoint Source Program. SFWA also conducts an annual Bear Creek Clean-up, Nature Hikes, and educational programs in collaboration with the local Boys & Girls Club. Lynne Anderson serves as the part-time watershed coordinator for SFWA. The steering committee meets regularly and holds periodic educational programs. For more information contact Lynne at SFWA, P.O. Box 490, Helenwood, TN 37755, lynnetec2002@yahoo.com, phone 423-663-4540.

5.4.B. The Cumberland River Compact. The mission of the Cumberland River Compact is to enhance the water quality of the Cumberland River and its tributaries through education and by promoting cooperation among citizens, businesses, and agencies in Kentucky and Tennessee.

We are a unique non-profit group that believes we can have both a strong economy and a healthy environment. The Compact is made up of businesses, individuals, community organizations and agencies working in the Cumberland River watershed. Over 2 million people share this watershed. Compact members work with all interested organizations and individuals to help ensure that our rivers and streams continue to provide us with clean water,bountiful crops, healthy fisheries and abundant recreational opportunities.

Since 1997, the Compact has set out to create a Watershed Outreach Program in each of the 14 watersheds that make up the Cumberland Basin. Members and staff of the Compact work with local communities to develop watershed forums where citizens can come together to learn more about their watershed and participate in developing a shared vision for the future. We welcome your interest and participation in this challenging project.

For more information about the Cumberland River Compact and to learn more about your local watershed, contact us at info@cumberlandrivercompact.org ;615-837-1151 or join us on the web at http://www.cumberlandrivercompact.org.

5.4.C. The Nature Conservancy (TNC). The Tennessee State Wildlife Action Plan (SWAP), formerly known as the Comprehensive Wildlife Conservation Strategy (CWCS), was developed by the Tennessee Wildlife Resources Agency with assistance from The Nature Conservancy in 2005. Congress mandated that each state and territory in the United States develop a SWAP as a requirement for continued receipt of federal State Wildlife Grant funding. These plans require the completion of 8 key elements of wildlife planning: 1) a list of animal species of greatest conservation need, 2) information about the distribution and abundance of species targets, 3) locations and relative conditions of key habitats, 4) descriptions of problems affecting target species and their habitats, 5) descriptions of conservation actions and priorities for conserving target species and habitats, 6) details for monitoring target species, conservation actions, and adaptive management, 7) discussion of plans to review the SWAP at specific intervals, and 8) information about coordination and implementation of the SWAP with major stakeholders. In Tennessee, the SWAP was integrated into a spatial model using Geographic Information Systems (GIS) and other database technology. Priority aquatic, terrestrial, and subterranean areas for conservation were identified across the state. Priorities were determined in the GIS model based upon relative differences in species rarity, population viability, and potential mobility of species across habitat units. Priority problems affecting species and needed conservation actions are detailed across each region of the state.

For complete information about the Tennessee SWAP, please visit:
http://www.state.tn.us/twra/cwcs/cwcsindex.html to read or download the full report.

Contact:
Chris Bullington
State Conservation Planning Manager
The Nature Conservancy, TN Chapter
2021 21st Avenue South; Suite C-400
Nashville, TN 37212
phone: (615) 383-9909 x 227

5.4.D. Hull-York Lakeland Resource Conservation and Development (RC&D) Council.
The RC&D Council mission is to *"Provide leadership to local communities to improve quality of life and conserve natural resources by organizing partners and facilitating technical and financial assistance resources".*

Hull-York Lakeland RC&D Council covers 14-counties of the Upper Cumberland area. These counties are: Macon, Clay, Pickett, Fentress, Overton, Jackson, Smith, DeKalb, Putnam, Cumberland, White, Van Buren, Warren and Cannon. Recreation in this area is dependant on a high standard of water quality. The main recreational attractions in the RC&D area are Dale Hollow Lake, Center Hill Lake, Cordell Hull Lake, and the scenic trout waters of the Caney Fork River. These resources attract large numbers of visitors to the area each year, and Hull-York Lakeland therefore has a vested interest in insuring the water quality of its watersheds.

Hull-York Lakeland RC&D Council has many local, state, federal and private partners with similar interests in the RC&D area. These partners join forces to engage in programs and projects that help individual land users and communities improve and conserve the natural resources, and engage in projects that enhance community and economic development activities. Hull-York Lakeland was the first RC&D area authorized by USDA in the state of Tennessee, and one of the first in the nation. Hull-York Lakeland was authorized in 1966.

Past projects have included Cane Creek Park and Lake in Putnam County, Camp Discovery in Jackson County, farmers markets is several counties, and emergency services consolidation projects. Current projects include a 319(h) grant for development of a watershed management plan in the Post Oak Creek Watershed. This watershed is 16,000+ acres and has been identified on the Tennessee 303(d) list of impaired waters as not meeting intended uses due to agriculture. The RC&D Council's goal is to develop a plan that identifies needs and problems in the watershed in order to have it removed from the 303(d) list, and then submit a project for funding practices that address those needs and problems.

Hull-York Lakeland RC&D Council has received a grant from the Tennessee Department of Agriculture – Agriculture Resources Conservation Fund (TDA – ARCF) with which they have purchased a tree planter in order to promote tree planting in riparian corridors to improve and enhance water quality. The Council has also received grants from TDA-ARCF, TWRA, and Quail Unlimited in order to purchase a Native Warm Season Grass No-Till Drill. This drill was purchased in May 2006 to promote the planting of Native Warm Season Grasses in the Upper Cumberland Area to create and enhance wildlife habitat, as well as establish buffers and field borders to improve water quality.

In 2006 Hull-York Lakeland has so far received $108,442 in direct grants, and has assisted communities in the receipt of $445,692. These funds are being used to address water quality and community development issues. For more information about Hull-York Lakeland RC&D Council contact Jeff Sanders at (931) 528-6472, ext. 110, or jeff.sanders@tn.usda.gov. You can also go to the council's website at: http://www.hylrcd.org.

5.4.E. Cumberland Mountain Resource Conservation and Development (RC&D) Council.
The RC&D program is a United States Department of Agriculture (USDA) program administered by the Natural Resources Conservation Service. This program helps people on a local level, with the assistance of a Federal Coordinator, to work together with many local organizations, county and city governments and conservation districts to implement natural resource protection and community development. Once a specific area has been authorized by the Secretary of Agriculture, that area is eligible for assistance through its RC&D council.

RC&D council projects involving water are designed to help improve surface and groundwater quality and quantity. Projects may include watershed management; construction or rehabilitation of irrigation, flood control and water drainage systems; construction or rehabilitation of aquaculture, wastewater treatment and purification systems; installation of buffer strips; and efficient use of aquifers.

The Cumberland Mountain RC&D council area includes five Tennessee counties: Anderson, Campbell, Morgan, Roane and Scott.

For more information please contact Alan Neal, coordinator, at alan.neal@tn.usda.gov.

CHAPTER 6

RESTORATION STRATEGIES IN THE SOUTH FORK CUMBERLAND RIVER WATERSHED

6.1. BACKGROUND.

The Watershed Water Quality Management Plan serves as a comprehensive inventory of resources and stressors in the watershed, a recommendation for control measures, and a guide for planning activities in the next five-year watershed cycle and beyond. Water quality improvement will be a result of implementing both regulatory and nonregulatory programs.

In addition to the NPDES program, some state and federal regulations, such as the TMDL and ARAP programs, address point and nonpoint issues. Construction and MS4 storm water rules (implemented under the NPDES program) have transitioned from Phase 1 to Phase 2. More information on storm water rules may be found at: http://www.state.tn.us/environment/wpc/stormh2o/.

This Chapter addresses point and nonpoint source approaches to water quality problems in the Tennessee portion of the South Fork Cumberland River Watershed.

6.2. COMMENTS FROM PUBLIC MEETINGS. Watershed meetings are open to the public, and most meetings were represented by citizens who live in the watershed, NPDES permitees, business people, farmers, and local river conservation interests. Locations for meetings were chosen after consulting with people who live and work in the watershed. Everyone with an interest in clean water is encouraged to be a part of the public meeting process. The times and locations of watershed meetings are posted at: http://www.state.tn.us/environment/wpc/watershed/public.shtml.

6.2.A. Year 1 Public Meeting. The first South Fork Cumberland River Watershed public meeting was held September 14, 1999 as a joint meeting with the Clear Fork of the Cumberland River Watershed at the York Institute in Jamestown. The goals of the meeting were to: (1) present, and review the objectives of, the Watershed Approach, (2) introduce local, state, and federal agency and nongovernmental organization partners, (3) review water quality monitoring strategies, and (4) solicit input from the public.

Major Concerns/Comments

- Logging in remote areas and its effect on rivers and steams (sediment)
- Effects of abandoned mines on water quality
- Recreational abuse
- Water quality impacts on water quality (from small impoundments)
- Loss of biodiversity (fish and mussels)
- Effects of urbanization (water supply, nonpoint sources of pollution, wastewater treatment plants)
- Brine from oil and gas wells

6.2.B. Year 3 Public Meeting. The second South Fork Cumberland River Watershed public meeting was held November 27, 2001 as a joint meeting with the Clear Fork of the Cumberland River Watershed at the York Institute in Jamestown. The goals of the meeting were to: (1) provide an overview of the watershed approach, (2) review the monitoring strategy, (3) summarize the most recent water quality assessment, (4) discuss the TMDL schedule and citizens' role in commenting on draft TMDLs, and (5) discuss BMPs and other nonpoint source tools available through the Tennessee Department of Agriculture 319 Program and NRCS conservation assistance programs.

Major Concerns/Comments

- Water quantity is also an issue. We need a plan that addresses that along with water quality
- Small steams at low flow cannot assimilate the load associated with discharges from other tributaries

6.2.C. Year 5 Public Meeting. The third scheduled South Fork Cumberland River Watershed public meeting was held October 4, 2007 at the York Institute in Jamestown. The meeting was held jointly with the Obey River and Clear Fork of the Cumberland River Watersheds and featured seven educational components:

- Overview of watershed approach flash video
- Benthic macroinvertebrate specimens and interpretation
- SmartBoard™ with interactive GIS maps
- "Is Your Stream Healthy" self-guided slide show
- "Why We Do Biological Sampling" self-guided slide show
- Water supply and ground water protection educational display
- Water quality and land use maps

In addition, citizens had the opportunity to make formal comments on the draft Watershed Water Quality Management Plan.

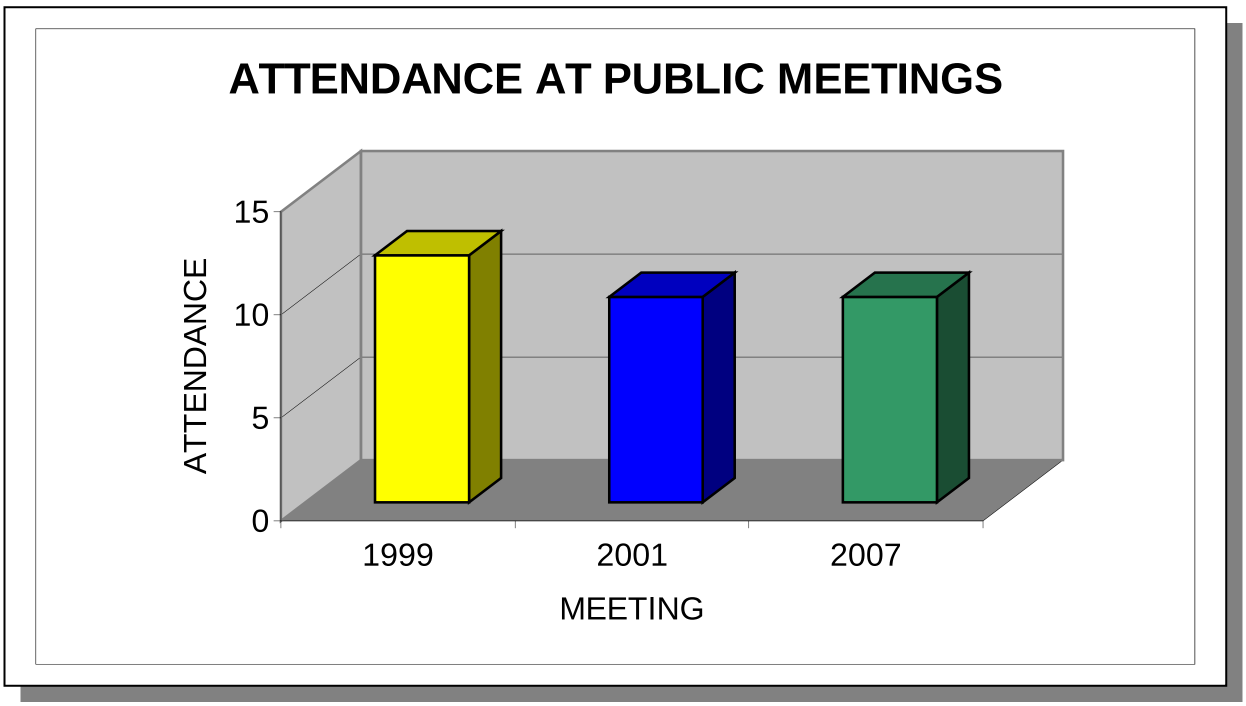

Figure 6-1. Attendance at the South Fork Cumberland Watershed Public Meetings. *Attendance numbers do not include TDEC personnel. Meetings in 1999 and 2001 represent South Fork Cumberland River and Clear Fork of the Cumberland River Watersheds joint public meetings. Meeting in 2007 represents South Fork Cumberland River, Obey River, and Clear Fork of the Cumberland River Watersheds joint public meeting.*

6.3. APPROACHES USED.

6.3.A. Point Sources. Point source contributions to stream impairment are primarily addressed by NPDES and ARAP permit requirements and compliance with the terms of the permits. Notices of NPDES and ARAP draft permits available for public comment can be viewed at http://www.state.tn.us/environment/wpc/wpcppo/. Discharge monitoring data submitted by NPDES-permitted facilities may be viewed at http://www.epa.gov/enviro/html/pcs/pcs_query_java.html.

The purpose of the TMDL program is to identify remaining sources of pollution and allocate pollution control needs in places where water quality goals are still not being achieved. TMDL studies are tools that allow for a better understanding of load reductions necessary for impaired streams to return to compliance with water quality standards. More information about Tennessee's TMDL program may be found at:
http://www.state.tn.us/environment/wpc/tmdl/.

Approved TMDL:

Pine Creek. TMDL for E. coli in the South Fork Cumberland River Watershed, Scott County. Approved February 27, 2006.
http://www.state.tn.us/environment/wpc/tmdl/approvedtmdl/PineCreekEcoli.pdf

TMDLs are prioritized for development based on many factors.

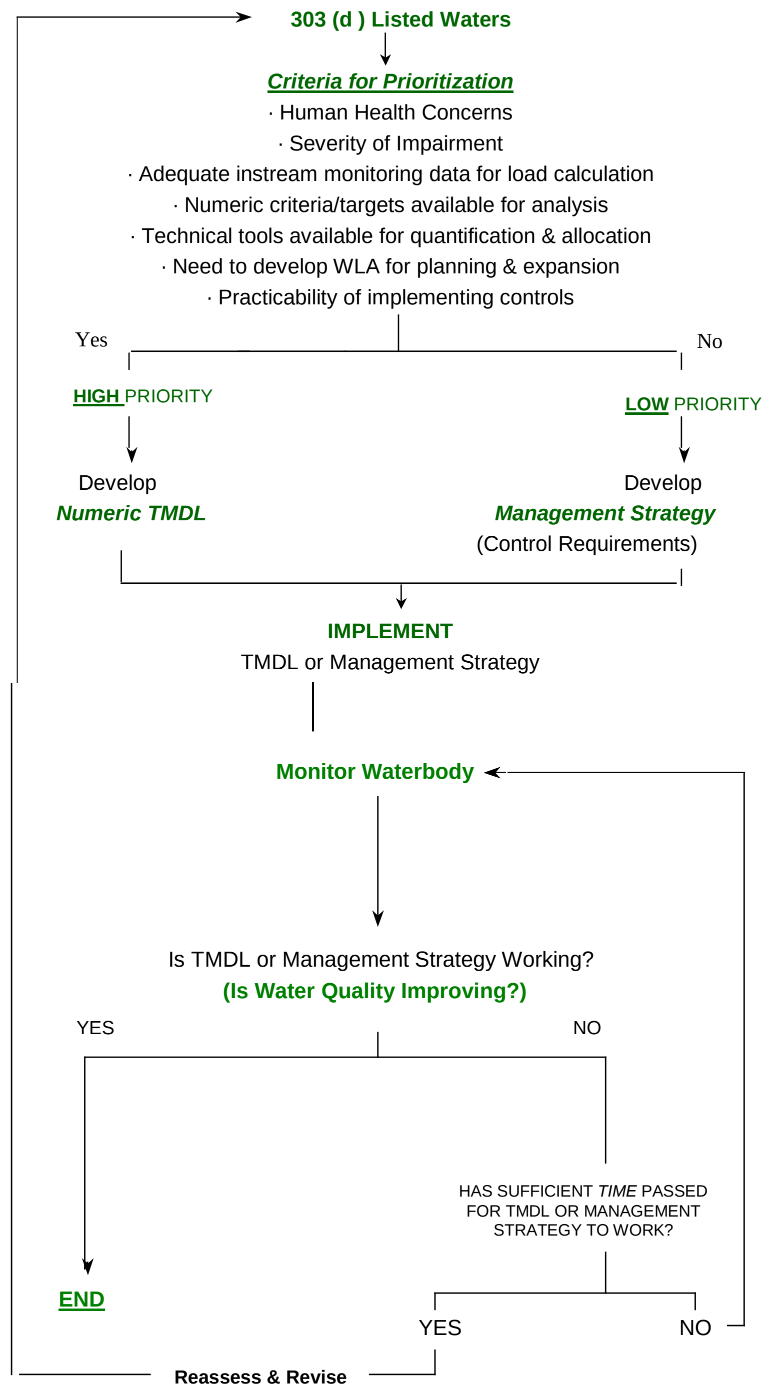

Figure 6-2. Prioritization Scheme for TMDL Development.

6.3.B. Nonpoint Sources

Common nonpoint sources of pollution in the South Fork Cumberland River Watershed include urban storm water runoff, riparian vegetation removal and other habitat alterations, as well as inappropriate land development, road construction, and agricultural practices. Since nonpoint pollution exists essentially everywhere rain falls, existing point source regulations can have only a limited effect. Other measures are, therefore, necessary.

There are several state and federal regulations that address contaminants impacting waters in the South Fork Cumberland River Watershed. Most of these are limited to point sources: a pipe or ditch. Often, controls of point sources are not sufficient to protect waters, so other measures are necessary. Some measures include efforts by landowners and volunteer groups and the possible implementation of new regulations. Many agencies, such as the Tennessee Department of Agriculture (TDA) and the Natural Resources Conservation Service (NRCS), offer financial assistance to landowners for corrective actions (like Best Management Practices) that may be sufficient for recovery of impacted streams. Many nonpoint problems will require an active civic involvement at the local level geared towards establishment of improved zoning guidelines, building codes, streamside buffer zones and greenways, and general landowner education.

The following text describes types of impairments, possible causes, and suggested improvement measures. Restoration efforts should not be limited to only those streams and measures suggested below.

6.3.B.i. Sedimentation.

6.3.B.i.a. From Construction Sites. Construction activities have historically been considered "nonpoint sources." In the late 1980's, EPA designated them as being subject to NPDES regulation if more than 5 acres were being disturbed. In the spring of 2003, that threshold became 1 acre. The general permit issued for such construction sites establishes conditions for maintenance of the sites to minimize pollution from storm water runoff, including requirements for installation and inspection of erosion prevention and sediment controls. Also, the general permit imposes more stringent inspection, design criteria, sediment control measures, and self-monitoring requirements on sites in the watershed of streams that are already impaired due to sedimentation or are considered high quality. Regardless of the size, no construction site is allowed to cause a condition of pollution. There are currently no waterbodies in the South Fork Cumberland River Watershed listed as impaired by sedimentation from construction activities.

Beginning in 2003, the state began requiring some municipalities to obtain coverage under a permit designed to address nonpoint runoff issues: the General NPDES Municipal Separate Storm Sewer System Permit, commonly known as MS4. This permit requires the holder to develop a comprehensive storm water management program, including the adoption of local regulatory ordinances, regular inspection of construction sites and other discharges into their storm sewers, and a variety of educational, mapping, and monitoring activities. The state audits and oversees these local MS4 programs.

6.3.B.i.b. From Channel and/or Bank Erosion. Many streams within the South Fork Cumberland River Watershed suffer from varying degrees of streambank erosion. When steam channels are altered, banks can become unstable and highly erodable. Heavy livestock traffic can also severely disturb banks. When large tracts of land are cleared of vegetation (especially trees) and replaced with impermeable surfaces like asphalt and rooftops, the large increases in the velocities and volumes of storm water runoff can also overwhelm channel and bank integrity because destabilized banks contribute to sediment loadings and to the loss of beneficial riparian vegetation.

Some inappropriate agricultural practices and overzealous land development have impacted the hydrology and morphology of stream channels in this watershed, although none severely enough to cause a loss of use impairment at this time.

Several agencies such as the NRCS and TDA, as well as citizen watershed groups, are working to stabilize portions of stream banks using bioengineering and other techniques. Many of the affected streams could benefit from these types of projects.

Some methods or controls that might be necessary to address common problems are:

Voluntary Activities

- Re-establish bank vegetation.
- Establish off-channel watering areas for livestock by moving watering troughs and feeders back from stream banks, or at least limit cattle access to restricted areas with armored bank entry.
- Limit cattle access to streams and bank vegetation.

Regulatory Strategies

- Require post-construction run-off rates to be no greater than pre-construction rates in order to avoid in-channel erosion.
- Implement additional restrictions on logging in streamside management zones.
- Restrict the use of off-highway vehicles on stream banks and in stream channels.
- Limit road and utility crossings of streams through better site design.

Additional Strategies

- Increase efforts in the Master Logger program to recognize impaired streams and require more effective management practices.
- Better community planning for the impacts of development on small streams, especially development in growing areas.
- Encourage or require strong local buffer ordinances.
- Limit clearing of stream and ditch banks or other alterations. *Note: Permits may be required for any work along streams.*

6.3.B.i.c. From Agriculture and Silviculture. The Water Quality Control Act exempts normal agricultural and silvicultural practices that do not result in a point source discharge. Nevertheless, efforts are being made to address impacts due to these exempted practices.

The Master Logger Program has been in place for several years to train loggers how to install Best Management Practices that lessen the impact of logging activities on streams. Recently, laws and regulations established the authority for the Commissioners of the Departments of Environment and Conservation and of Agriculture to stop the logging operation that, upon failing to install these BMPs, is causing impacts to streams.

Since the Dust Bowl era, the agriculture community has strived to protect the soil from wind and water erosion. Agencies such as the Natural resources Conservation Service (NRCS), the University of Tennessee Agricultural Extension Service, and the Tennessee Department of Agriculture are striving to identify better ways of farming, to educate the farmers, and to install the methods that address the sources of some of the impacts due to agriculture. Cost sharing is available for many of these measures.

Many sediment problems traceable to agricultural practices also involve riparian loss due to close row cropping or pasture clearing for grazing. Lack of vegetated buffers along stream corridors is a problem in some areas of the South Fork Cumberland River Watershed, due both to agricultural and residential/commercial land uses. Impacted streams that could benefit from the establishment of more extensive riparian buffer zones are portions of Pine Creek and Brimstone Creek.

6.3.B.ii. Pathogen Contamination.

Possible sources of pathogens in streams are inadequate or failing septic tank systems, overflows or breaks in public sewer collection systems, poorly disinfected discharges from sewage treatment plants, and fecal matter from pets, livestock and wildlife washed into streams and storm drains. When fecal bacterial levels are shown to be consistently elevated to dangerously high levels, especially in streams with high potential for recreational uses, the division must post signage along the creek warning the public to avoid contact. Once pathogen sources have been identified and corrected, and pathogen level reductions are documented, the posting is lifted.

Permits issued by the Division of Water Pollution Control regulate discharges from point sources and require adequate control for these sources. Individual homes are required to have subsurface, on-site treatment (i.e., septic tank and field lines) if public sewers are not available. The Division of Ground Water Protection within the Knoxville and Cookeville Environmental Field Offices and delegated county health departments regulate septic tanks and field lines. In addition to discharges to surface waters, businesses may employ subsurface treatment for domestic wastewater or surface discharge of treated process wastewater. The Division of Water Pollution Control regulates surface water discharges and near-surface land application of treated wastewater.

Currently, one stream system in the Tennessee portion of the South Fork Cumberland River Watershed is known to have excessive pathogen contamination. Pine Creek and its tributaries are impacted by urban areas, with contributions of bacterial contamination coming from storm water runoff and sewage collection system leaks.

Some measures that may be necessary to control pathogens are:

Voluntary Activities

- Clean up pet waste.
- Repair failed septic systems.
- Establish off-channel watering of livestock.
- Limit livestock access to streams and restrict stream crossings.
- Improve and educate on the proper management of animal waste from confined feeding operations.

Regulatory Strategies

- Strengthen enforcement of regulations governing on-site wastewater treatment.
- Determine timely and appropriate enforcement for non-complying sewage treatment plants, large and small, and their collection systems.
- Identify Concentrated Animal Feeding Operations not currently permitted.
- Develop and enforce leash laws and controls on pet fecal material.

Additional Strategies

- Develop intensive planning in areas where sewer is not available and treatment by subsurface disposal is not an option due to poor soils, floodplains, or high water tables.
- Greater efforts by sewer utilities to identify leaking lines or overflowing manholes.
- Review the pathogen limits in discharge permits to determine the need for further restriction.

6.3.B.iii. Excessive Nutrients and/or Dissolved Oxygen Depletion.

These two impacts are usually listed together because high nutrients often contribute to low dissolved oxygen within a stream. Since nutrients often have the same source as pathogens, the measures previously listed can also address many of these problems. Elevated nutrient loadings are also often associated with urban runoff from impervious surfaces, from fertilized lawns and croplands, and faulty sewage disposal processes. Nutrients are often transported with sediment, so many of the measures designed to reduce sediment runoff will also aid in preventing organic enrichment of streams and lakes.

Dissolved oxygen depletion can also be due to the discharge of other biodegradable materials. These are limited in NPDES permits as ammonia and as either Biological Oxygen Demand (BOD) or Carbonaceous Oxygen Demand (CBOD).

Some sources of nutrients can be addressed by:

Voluntary Activities

- Educate homeowners and lawn care companies in the proper application of fertilizers.
- Encourage landowners, developers, and builders to leave stream buffer zones. Streamside vegetation can filter out many nutrients and other pollutants before they reach the stream. These riparian buffers are also vital along livestock pastures.
- Use grassed drainage ways that can remove fertilizer before it enters streams.
- Use native plants for landscaping since they don't require as much fertilizer and water.
- Develop better overall storm water management in urban and residential areas, including retrofitting existing commercial lots, homes, and roadways with storm water quality and quantity BMPs. This would especially improve the urban streams and lakes currently polluted by excessive nutrient inputs.

Physical changes to streams can prevent them from providing enough oxygen to biodegrade the materials that are naturally present. A few additional actions can address this problem:

- Maintain shade over a stream. Cooler water can hold more oxygen and retard the growth of algae. As a general rule, all stream channels suffer from some canopy removal. An intact riparian zone also acts as a buffer to filter out nutrient loads before they enter the water.
- Discourage impoundments. Ponds and lakes do not aerate water. *Note: Permits may be required for any work on a stream, including impoundments.*

Regulatory Strategies.

- Strengthen enforcement of regulations governing on-site wastewater treatment.
- Impose more stringent permit limits for nutrients discharged from sewage treatment plants.
- Impose timely and appropriate enforcement for noncomplying sewage treatment plants, large and small, and their collection systems.
- Encourage TDA- and NRCS-sponsored educational programs targeted to agricultural landowners and aimed at better nutrient management, as well as information on technology-based application tools.
- Identify Concentrated Animal Feeding Operations (CAFO) not currently permitted.
- Identify any Animal Feeding Operations (AFO) that contribute to stream impacts and declare them as a CAFO requiring a permit.
- Require nutrient management plans for all golf courses.

6.3.B.iv. Toxins and Other Materials.

Although some toxic substances are discharged directly into waters of the state from a point source, much of these materials are washed in during rainfalls from an upland location, or via improper waste disposal that contaminates groundwater. In the Tennessee portion of the South Fork Cumberland River Watershed, a relatively small number of streams are damaged by storm water runoff from industrial facilities or urban areas. More stringent inspection and regulation of permitted industrial facilities, and local storm water quality initiatives and regulations, could help reduce the amount of contaminated runoff reaching state waters. Examples of streams that could benefit from these measures include Pine Creek and its tributaries

Individuals may also cause contaminants to enter streams by activities that may be attributed to apathy or the lack of knowledge or civility. Litter in roadside ditches, garbage bags tossed over bridge railings, paint brushes washed off over storm drains, and oil drained into ditches are all blatant examples of pollution in streams. To lessen the future impact to the waters of the state, each community can strive to raise its awareness for better conservation practices and prosecution of violators.

Some of these problems can be addressed by:

Voluntary Activities

- Provide public education.
- Paint warnings on storm drains that connect to a stream.
- Sponsor community clean-up days.
- Landscape public areas.
- Encourage public surveillance of their streams and reporting of dumping activities to their local authorities.

Regulatory Strategies

- Continue to prohibit illicit discharges to storm drains and to search them out.
- Strengthen litter law enforcement at the local level.
- Increase the restrictions on storm water runoff from industrial facilities.

6.3.B.v. Habitat Alteration.

The alteration of the habitat within a stream can have severe consequences. Whether it is the removal of the vegetation providing a root system network for holding soil particles together, the release of sediment, which increases the bed load and covers benthic life and fish eggs, the removal of gravel bars, “cleaning out” creeks with heavy equipment, or the impounding of the water in ponds and lakes, many alterations impair the use of the stream for designated uses. Habitat alteration also includes the draining or filling of wetlands.

Although large-scale public projects such as highway construction can alter significant portions of streams, individual landowners and developers are responsible for the vast majority of stream alterations. Some measures that can help address these problems are:

Voluntary Activities

- Sponsor litter pickup days to remove litter that might enter streams
- Organize stream cleanups removing trash, limbs and debris before they cause blockage.
- Avoid use of heavy equipment to “clean out” streams. Instream work other than debris removal will require an Aquatic Resource Alteration Permit (ARAP).
- Plant native vegetation along streams to stabilize banks and provide habitat.
- Encourage developers to avoid extensive use of culverts in streams.

Regulatory Strategies

- Restrict modification of streams by means such as culverting, lining, or impounding.
- Require mitigation for impacts to streams and wetlands when modifications are allowed.
- Require permitting of all rock harvesting operations.
- Increased enforcement may be needed when violations of current regulations occur, especially for illicit gravel dredging.

6.3.B.vi. Tennessee Land Reclamation.

Abandoned Coal Mines pose serious threats to public health, safety, and welfare as well as degrade the environment. The programs of Tennessee Land reclamation Section accomplish three important things: (1) They remove dangerous health and safety hazards that threaten the citizens of Tennessee, (2) They improve the environment, and (3) They restore resources to make them available for economic development, recreation, and other uses. Problems typically addressed by the Land reclamation Section include open or improperly filled mine shafts, dilapidated mine buildings and equipment, toxic mine refuse and drainage, landslides, mine fires, highwalls, and subsidence.

Projects on the ground:

- New River Water Line. A project to extend water lines to communities where domestic water supplies have been impacted by past mining.
- New River Mussel Survey.
- High Point Landslide. Tree planting and hand seeding a 20-acre landslide.

6.3.B.vi. Storm Water.

MS4 discharges are regulated through the Phase I or II NPDES-MS4 permits. These permits require the development and implementation of a Storm Water Management Program (SWMP) that will reduce the discharge of pollutants to the maximum extent practicable and not cause or contribute to violations of state water quality standards. The NPDES General Permit for Discharges from Phase I and II MSF facilities can be found at:

http://www.state.tn.us/environment/wpc/stormh2o/.

For discharges into impaired waters, the MS4 General Permit requires that SWMPs include a section describing how discharges of pollutants of concern will be controlled to ensure that they do not cause or contribute to instream exceedances of water quality standards. Specific measurements and BMPs to control pollutants of concern must also be identified. In addition, MS4s must implement the proposed waste load allocation provisions of an applicable TMDL (i.e., siltation/habitat alteration, pathogens) and describe methods to evaluate whether storm water controls are adequate to meet the waste load allocation. In order to evaluate SWMP effectiveness and demonstrate compliance with specified waste load allocations, MS4s must develop and implement appropriate monitoring programs.

Some storm sewer discharges are not regulated through the NPDES MS4 program. Strategies to address runoff from in these urban areas include adapting Tennessee Growth Readiness Program (TGRP) educational materials to the watershed. TGRP is a statewide program built on existing best management practices from the Nonpoint Education for Municipal Officials program and the Center for Watershed Protection. TGRP developed the program to provide communities and counties with tools to design economically viable and watershed friendly developments. The program assists community leaders in reviewing current land use practices, determining impacts of imperviousness on watershed functions, and allowing them to understand the economics of good watershed management and site design.

6.3.C. Special Projects.

Several agencies are working together to address the impacts from inappropriate logging and mining practices in the New River Subwatershed (0513010401). The New River Watershed drains the southeast portion of the South Fork of the Cumberland River Watershed. The New River and the Clear Fork join to form the South Fork of the Cumberland River.

The Tennessee Department of Environment and Conservation and the U.S. Geological Survey convened an initial meeting on October 26, 2007 in Knoxville. In attendance were the following agencies:

Federal: U.S. Geological Survey, National Park Service, Tennessee Valley Authority, Office of Surface Mining, and U.S. Fish and Wildlife Service

State: Tennessee Department of Environment and Conservation, Tennessee Wildlife Resources Agency, and Tennessee division of Forestry

NGO: The Nature Conservancy and National Parks Conservation Association

Academic: University of Tennessee

The agencies agreed to improve scientific understanding of the New River Watershed and to involve grass-roots local groups in discussions about the future of the New River Watershed.

A Memorandum of Understanding will be drafted to guide agencies' activities in coordinating efforts and enhancing communication. Through coordination and communication the signatories can provide for more efficient use of resources, reduce costs, and reduce the time required to take appropriate action to protect and preserve the rivers.

The tasks to be accomplished include scientific research, coordinating activities and sharing information in regard to the New River. Further scientific research needs to be done on the pollutants from the different sources, the way in which they impact aquatic life, and the best methods of treating the pollutants or preventing them from entering the rivers.

The signatories agree to establish a Technical Advisory Committee to coordinate actions of the signatories in regard to the New River. These include, but are not be limited to:

(a) Sharing existing information and data;
(b) Identifying most impacted sub-watersheds;
(c) Identifying potential for episodic, high risk events from different categories of sources;
(d) Analyzing available models, developing model specifications, and overseeing modeling studies;
(e) Identifying data sets relating land use to environmental quality and facilitating the sharing of these data;
(f) Developing protocols for hydrologic and biologic monitoring networks;
(g) Determining available spatial information, identifying spatial data sets to be collected, establishing time lines and approaches for collecting and maintaining the data;
(h) Developing an integrated assessment of pollutant sources and responses of the biological communities;
(i) Developing specifications for data clearing house and web site and identifying appropriate facility to host them; and
(j) Establishing ad hoc working groups for coordinating efforts on issues of concern to some or all of the signatories, as the need arises, including but not limited to, Abandoned Mine Lands issues or addressing observed impacts to the New River or its tributaries.

6.4. PERMIT REISSUANCE PLANNING

Under the *Tennessee Water Quality Control Act*, municipal, industrial and other dischargers of wastewater must obtain a permit from the Division. Approximately 1,700 permits have been issued in Tennessee under the federally delegated National Pollutant Discharge Elimination System (NPDES). These permits establish pollution control and monitoring requirements based on protection of designated uses through implementation of water quality standards and other applicable state and federal rules.

The following three sections provide specific information on municipal, industrial, and water treatment plant active permit holders in the South Fork Cumberland River Watershed. Compliance information was obtained from EPA's Permit Compliance System (PCS). All data was queried for a five-year period between August 1, 2002 and July 31, 2007. PCS can be accessed publicly through EPA's Envirofacts website. This website provides access to several EPA databases to provide the public with information about environmental activities that may affect air, water, and land anywhere in the United States:

http://www.epa.gov/enviro/html/ef_overview.html

Stream Segment information, including designated uses and impairments, are described in detail in Chapter 3, *Water Quality Assessment of the South Fork Cumberland River Watershed.*

6.4.A. Municipal Permits

TN0061603 Bandy Creek Campground

Discharger rating: Minor
City: Oneida
County: Scott
EFO Name: Knoxville
Issuance Date: 1/1/05
Expiration Date: 11/30/09
Receiving Stream(s): Unnamed tributary at mile 0.2 to Bandy Creek at mile 3.3
HUC-12: 051301040401
Effluent Summary: Treated domestic wastewater from Outfall 001
Treatment system: Two biological lagoons in series, lined sand filter and chlorination

Segment	TN05130104013_0300
Name	Bandy Creek
Size	8.3
Unit	Miles
First Year on 303(d) List	-
Designated Uses	Fish and Aquatic Life (Not Assessed), Recreation (Not Assessed), Irrigation (Not Assessed), Livestock Watering and Wildlife (Not Assessed)
Causes	N/A
Sources	N/A

Table 6-1. Stream Segment Information for Bandy Creek Campground.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	Summer	4	mg/L	DMax Conc	2/Month	Grab	Effluent
Ammonia as N (Total)	Summer	2	mg/L	MAvg Conc	2/Month	Grab	Effluent
Ammonia as N (Total)	Winter	10	mg/L	DMax Conc	2/Month	Grab	Effluent
Ammonia as N (Total)	Winter	5	mg/L	MAvg Conc	2/Month	Grab	Effluent
CBOD5	All Year	25	mg/L	DMax Conc	2/Month	Grab	Effluent
CBOD5	All Year	15	mg/L	MAvg Conc	2/Month	Grab	Effluent
D.O.	All Year	6	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Ari Mean	2/Month	Grab	Effluent
Fecal Coliform	All Year	1000	#/100mL	DMax Conc	2/Month	Grab	Effluent
Fecal Coliform	All Year	200	#/100mL	MAvg Geo Mean	2/Month	Grab	Effluent
Flow	All Year		MGD	DMax Load	Weekdays	Instantaneous	Effluent
Flow	All Year		MGD	MAvg Load	Weekdays	Instantaneous	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	2/Week	Grab	Effluent
TRC	All Year	0.5	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	2/Month	Grab	Effluent
TSS	All Year	30	mg/L	MAvg Conc	2/Month	Grab	Effluent
pH	All Year	9	SU	DMax Conc	2/Week	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	2/Week	Grab	Effluent

Table 6-2. Permit Limits for Bandy Creek Campground.

Comments: None

TN0060186 Helenwood STP

Discharger rating: Minor
City: Helenwood
County: Scott
EFO Name: Knoxville
Issuance Date: 11/1/05
Expiration Date: 9/30/09
Receiving Stream(s): Phillips Creek Mile 4.1
HUC-12: 051301040108
Effluent Summary: Treated municipal wastewater from Outfall 001
Treatment system: Land application

Segment	TN05130104037_0100
Name	Phillips Branch
Size	15.6
Unit	Miles
First Year on 303(d) List	-
Designated Uses	Recreation (Supporting), Irrigation (Supporting), Fish and Aquatic Life (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	N/A
Sources	N/A

Table 6-3. Stream Segment Information for Helenwood STP.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	Summer	3	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	3	lb/day	DMax Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	1.5	mg/L	MAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	1	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	2	lb/day	MAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	5	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	4	lb/day	MAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	6	lb/day	DMax Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	2.5	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	3.75	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	% Removal
CBOD % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	% Removal
CBOD5	Summer	20	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	Summer	25	lb/day	DMax Load	3/Week	Composite	Effluent
CBOD5	Summer	10	mg/L	DMin Conc	3/Week	Composite	Effluent
CBOD5	Summer	17	lb/day	MAvg Load	3/Week	Composite	Effluent
CBOD5	Summer	15	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD5	Winter	46	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	Winter	38	lb/day	MAvg Load	3/Week	Composite	Effluent
CBOD5	Winter	55	lb/day	DMax Load	3/Week	Composite	Effluent
CBOD5	Winter	34.5	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD5	Winter	23	mg/L	DMin Conc	3/Week	Composite	Effluent
D.O.	All Year	6	mg/L	DMin Conc	Weekdays	Grab	Effluent
Fecal Coliform	All Year	1000	#/100mL	DMax Conc	3/Week	Grab	Effluent
Fecal Coliform	All Year	200	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
IC25 7day Ceriodaphnia dubia	All Year	100	Percent	DMin Conc	Monthly	Composite	Effluent
IC25 7day Fathead Minnows	All Year	100	Percent	DMin Conc	Monthly	Composite	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	Weekdays	Composite	Effluent
TSS	All Year	45	mg/L	DMax Conc	3/Week	Composite	Effluent
TSS	All Year	67	lb/day	DMax Load	3/Week	Composite	Effluent
TSS	All Year	30	mg/L	WAvg Conc	3/Week	Composite	Effluent

Table 6-4. Permit Limits for Helenwood STP.

Compliance History:
The following numbers of exceedences were noted in PCS:

36 Overflows
3 Bypasses
3 Total Suspended Solids
2 Ammonia
2 Settleable Solids
1 Carbonaceous Oxygen Demand
1 Carbonaceous Biological Oxygen Demand
1 Dissolved Oxygen

Comments (TN0060186 Helenwood STP):
1/26/07 Compliance Evaluation Inspection: In compliance.

TN0020753 Huntsville STP

Discharger rating:	Minor
City:	Huntsville
County:	Scott
EFO Name:	Knoxville
Issuance Date:	5/1/05
Expiration Date:	3/31/09
Receiving Stream(s):	New River at mile 14.8
HUC-12:	051301040106
Effluent Summary:	Treated municipal wastewater from Outfall 001
Treatment system:	Treatment consists of screening, biological treatment, membrane filtration, and ultraviolet disinfection.

Segment	TN05130104037_1000
Name	New River
Size	22.5
Unit	Miles
First Year on 303(d) List	-
Designated Uses	Fish and Aquatic Life (Supporting), Recreation (Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	N/A
Sources	N/A

Table 6-5. Stream Segment Information for Huntsville STP.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	All Year	3	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year	1.5	mg/L	MAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year	1.8	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year	3.8	lb/day	MAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year	4.5	lb/day	WAvg Load	3/Week	Composite	Effluent
CBOD % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	% Removal
CBOD % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	% Removal
CBOD5	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
CBOD5	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
CBOD5	Summer	8	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	Summer	15	lb/day	WAvg Load	3/Week	Composite	Effluent
CBOD5	Summer	6	mg/L	WAvg Conc	3/Week	Composite	Effluent
CBOD5	Summer	4	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD5	Summer	10	lb/day	MAvg Load	3/Week	Composite	Effluent
CBOD5	Winter	25	lb/day	MAvg Load	3/Week	Composite	Effluent
CBOD5	Winter	10	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD5	Winter	20	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	Winter	15	mg/L	WAvg Conc	3/Week	Composite	Effluent
CBOD5	Winter	38	lb/day	WAvg Load	3/Week	Composite	Effluent
D.O.	All Year	6	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	941	#/100mL	DMax Conc	3/Week	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Effluent
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Influent (Raw Sewage)
Settleable Solids	All Year	1	mL/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	3/Week	Composite	Effluent
TSS	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
TSS	All Year	30	mg/L	MAvg Conc	3/Week	Composite	Effluent
TSS	All Year	75	lb/day	MAvg Load	3/Week	Composite	Effluent
TSS	All Year	100	lb/day	WAvg Load	3/Week	Composite	Effluent
TSS	All Year	40	mg/L	WAvg Conc	3/Week	Composite	Effluent
TSS	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
TSS % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	% Removal
TSS % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	% Removal
pH	All Year	9	SU	DMax Conc	Weekdays	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	Weekdays	Grab	Effluent

Table 6-6. Permit Limits for Huntsville STP.

Compliance History:
The following numbers of exceedences were noted in PCS:

67 Overflows
8 Ammonia
4 Total Suspended Solids
4 Dissolved Oxygen
3 Total Chlorine
3 Carbonaceous Biological Oxygen Demand
1 Carbonaceous Oxygen Demand
2 pH
2 Settleable Solids

Enforcement:
2/1/06 Director's Order 06-0002 for operating the WWTP and collection system without a certified operator.

Comments (TN0020753 Huntsville STP):
Permit reissuance with expanded design capacity. STP expansion is from 0.15 MGD to 0.3 MGD and initiated operation on 11/11/04

3/28/07 Compliance Evaluation Inspection: In compliance
Comments from visit:

1. The treatment plant consists of screening, biological treatment, membrane filtration, and ultraviolet disinfection. The wastes from the digester go through a filter press then the sludge is disposed in the permitted county landfill.

2. According to the operator, the mixed liquor suspended solids (MLSS) under normal operations ranges between 15,000 and 18,000 mg/l. Considering the manufacturer's recommendations for this facility, this range far exceeds the design limit. The consequences of this practice could be that the expected length of service for the system is rapidly depleted. Furthermore, there is no back up system in the event of a system failure. Therefore, the division strongly recommends that Huntsville review the Operations and Maintenance Manual, discuss this matter with their consultant, and take appropriate action to bring the mixed liquor suspended solids under 15,000 mg/l.

3. Huntsville WWTP presently operates with the supervision of a Certified Operator, Grade III. The addition of this operator and his achieving certification has proved beneficial to the WWTP. The plant is still undermanned according to the manufacturer's recommendations and good operating practice. Huntsville must give serious consideration to providing an assistant technician who might also be trained to cover in the event of the operator's illness or vacation.

4. The sludge generated from this facility is disposed in the permitted county landfill. Based on visual observations, the filtering system does not appear to be providing adequate dewatering of the sludge. The system appears to be operating adequately, but may need some adjustment to bring the percent of solids up to 20%. By observations, there appears to be only 12% or less solids.

Having overly wet sludge may cause problems for the landfill including excessive leachate and may also cause a violation of the Special Waste Permit for the facility. Another consideration might be to construct a roof around the filter press to facilitate all-season, all-weather use.

5. Access for maintenance or recovery cleaning is currently limited. The operator has to uncouple hoses by physically hanging from a platform above the hoses or balancing on the piping to pull the filter modules for cleaning. This safety hazard was also noted in our December 29, 2005, inspection. You are strongly urged to arrive at a plan of action and implementation to provide safe access for the operator in all seasons for maintenance or recovery.

6. Huntsville WWTP uses ultraviolet lights for disinfection, and as we inspected the facility, it was noted that some of the lights were out of service. Having all lights functioning and having some on-hand for back up is crucial to this operation.

7. Based on our review of the files, some of the problems over years past have begun to be addressed. Overflows, bypasses, breakdowns, and all other items required by the permit are now reported in a timely manner. Huntsville WWTP reported two bypass events in February and May 2006.

TN0064424 Oneida STP

Discharger rating:	Minor
City:	Oneida
County:	Scott
EFO Name:	Knoxville
Issuance Date:	2/1/05
Expiration Date:	12/31/09
Receiving Stream(s):	Pine Creek at mile 7.2
HUC-12:	051301040402
Effluent Summary:	Treated municipal wastewater from Outfall 001
Treatment system:	Oxidation ditch preceded by screening and grit removal and followed by chlorine disinfecting and cascade aeration. Sludge is dewatered on beds using polymers.

Segment	TN05130104048_2000
Name	Pine Creek
Size	4.1
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Livestock Watering and Wildlife (Supporting), Irrigation (Supporting), Recreation (Non-Supporting), Fish and Aquatic Life (Non-Supporting), Domestic Water Supply (Non-Supporting)
Causes	Creosote, Alteration in stream-side or littoral vegetative covers, Dissolved Oxygen, Nitrates, Escherichia coli, Sedimentation/Siltation
Sources	Contaminated Sediments, Municipal Point Source Discharges, Channelization, On-site Treatment Systems (Septic Systems and Similar Decencentralized Systems), Sanitary Sewer Overflows (Collection System Failures)

Table 6-7. Stream Segment Information for Oneida STP.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	Summer	2.4	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	1.2	mg/L	MAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	1.8	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	15	lb/day	WAvg Load	3/Week	Calculated	Effluent
Ammonia as N (Total)	Summer	10	lb/day	MAvg Load	3/Week	Calculated	Effluent
Ammonia as N (Total)	Winter	3.8	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	16	lb/day	MAvg Load	3/Week	Calculated	Effluent
Ammonia as N (Total)	Winter	23	lb/day	WAvg Load	3/Week	Calculated	Effluent
Ammonia as N (Total)	Winter	2.8	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	1.9	mg/L	MAvg Conc	3/Week	Composite	Effluent
Bypass of Treatment (occurrences)	All Year		Occurrences/Month	MAvg Load	Continuous	Visual	Wet Weather
CBOD % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	% Removal
CBOD % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	% Removal
CBOD5	All Year	30	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent(Raw Sewage)
CBOD5	All Year	163	lb/day	MAvg Load	3/Week	Calculated	Effluent
CBOD5	All Year	20	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD5	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
CBOD5	All Year	25	mg/L	WAvg Conc	3/Week	Composite	Effluent
CBOD5	All Year	204	lb/day	WAvg Load	3/Week	Calculated	Effluent
Cyanide, Total (CN-)	All Year	0.005	mg/L	MAvg Conc	Quarterly	Grab	Effluent
Cyanide, Total (CN-)	All Year	0.038	lb/day	MAvg Load	Quarterly	Calculated	Effluent
D.O.	All Year	6	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	941	#/100mL	DMax Conc	3/Week	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Conc	3/Week	Grab	Effluent
Flow	All Year		MGD	DMax Conc	Daily	Continuous	Effluent
Flow	All Year		MGD	MAvg Conc	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	DMax Conc	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	MAvg Conc	Daily	Continuous	Effluent
IC25 7day Ceriodaphnia dubia	All Year	100	Percent	DMin Conc	Annually	Composite	Effluent
IC25 7day Fathead Minnows	All Year	100	Percent	DMin Conc	Annually	Composite	Effluent
Nitrite + Nitrate Total (as N)	All Year		mg/L	MAvg Conc	Monthly	Composite	Effluent
Overflow Use Occurrences	All Year	0	Occurrences/ Month	MAvg Load	Continuous	Visual	Non Wet Weather
Overflow Use Occurrences	All Year	0	Occurrences/ Month	MAvg Load	Continuous	Visual	Wet Weather
Phosphorus Total	All Year		mg/L	MAvg Conc	Monthly	Composite	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	3/Week	Grab	Effluent
TRC	All Year	0.02	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	3/Week	Composite	Effluent
TSS	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
TSS	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
TSS	All Year	40	mg/L	WAvg Conc	3/Week	Composite	Effluent
TSS	All Year	327	mg/L	WAvg Load	3/Week	Calculated	Effluent
TSS	All Year	245	lb/day	MAvg Load	3/Week	Calculated	Effluent

Table 6.8a.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
TSS	All Year	30	mg/L	MAvg Conc	3/Week	Composite	Effluent
TSS % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	% Removal
TSS % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	% Removal
pH	All Year	9	SU	DMax Conc	Weekdays	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	Weekdays	Grab	Effluent

Table 6-8b.

Tables 6-8a-b. Permit Limits for Oneida STP.

Compliance History:
The following numbers of exceedences were noted in PCS:

1 Bypass
2 Carbonaceous Biological Oxygen Demand
4 Suspended Solids % Removal
3 Ammonia
1 Total Suspended Solids
1 Settleable Solids

Comments (TN0064424 Oneida STP):
12/12/06 Compliance Evaluation Inspection – Satisfactory

Comments from 12/21/06 letter:

At the time of the division's inspection, the division noted some small floating material in the dechlorination chamber. This should not be discharged in the effluent. This material and larger plastics are not being removed by the bar screens and grit removal system currently in use. Allowing this material to move all the way through the WWTP can damage pumps and cause blockages. The headworks are old and an outdated removal system. Oneida should consider upgrading to a newer, more efficient grit removal system.

On March 10, 2006, the total suspended solids limit was violated because approximately 400,000 gallons bypassed from 1:00 AM to 8:00 AM due to heavy rainfall. Also, broken check valves contributed to these violations. In June 2006 Oneida STP reported three violations of ammonia, nitrogen due to heavy loading (two loads of 9000 gallons) of leachate from the landfill. Awareness of the source of these problems will avoid a repeat in the future.

A copy of the permit was available for review. All documents, laboratory reports, and monitoring reports were available for review and appear to be in line with the requirements and conditions of the permit. The inspectors found no visible sheen, scum, or other visible material contained in the outfall area.

TN0023035 Sunbright STP

Discharger rating: Minor
City: Sunbright
County: Morgan
EFO Name: Knoxville
Issuance Date: 6/1/04
Expiration Date: 4/30/09
Receiving Stream(s): White Oak Creek at mile 20.0
HUC-12: 051301040301
Effluent Summary: Treated domestic wastewater from Outfall 001
Treatment system: Activated sludge

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	Summer	4	mg/L	DMax Conc	2/Month	Grab	Effluent
Ammonia as N (Total)	Summer	2	mg/L	MAvg Conc	2/Month	Grab	Effluent
Ammonia as N (Total)	Winter	10	mg/L	DMax Conc	2/Month	Grab	Effluent
Ammonia as N (Total)	Winter	5	mg/L	MAvg Conc	2/Month	Grab	Effluent
CBOD5	All Year	20	mg/L	DMax Conc	2/Month	Grab	Effluent
CBOD5	All Year	10	mg/L	MAvg Conc	2/Month	Grab	Effluent
D.O.	All Year	6	mg/L	DMin Conc	Weekdays	Grab	Effluent
Fecal Coliform	All Year	1000	#/100mL	DMax Conc	2/Month	Grab	Effluent
Fecal Coliform	All Year	200	#/100mL	MAvg Geo Mean	2/Month	Grab	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	2/Week	Grab	Effluent
TRC	All Year	0.5	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	2/Month	Grab	Effluent
TSS	All Year	30	mg/L	MAvg Conc	2/Month	Grab	Effluent
pH	All Year	8.5	SU	DMax Conc	2/Week	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	2/Week	Grab	Effluent

Table 6-9. Permit Limits for Sunbright STP.

Enforcement:
9/26/06 Notice of Violation (Please see below)

***Comments (TN0023035 Sunbright STP)**:*
9/10/07 Comments from Knoxville EFO: Sunbright is in the process of getting better. They are looking to become a drip irrigation system.

9/19/06 Compliance Evaluation Inspection: Not in Compliance
Comments from 9/26/06 NOV:

On the day of the inspection the wastewater treatment plant (WWTP) appeared to be barely operational. The clarifier at the front of the tertiary sand filters was washing solids out the discharge to White Oak Creek. The tertiary sand filters were not in operation and have not been in operation for years. The tube settlers that were originally installed with the treatment plant no longer are part of the treatment process. This only leaves the clarifier in front of the sand filters. During this inspection, the division witnessed the effluent leaving the plant, which had a very objectionable color contrast and appeared to have a significant amount of solids in it. This is a violation of the NPDES Permit TN0023035 Part I Section A. stating that wastewater discharge must not cause an objectionable color contrast in the receiving stream.

The City of Sunbright has not reported effluent violations on the monthly operational report during calendar 2005.

The City of Sunbright received a community block grant of $500,000. This money has been designated to upgrade the current WWTP. Sunbright is in the preliminary stage of putting together an engineering report and alternatives analysis.

6.4.B. Industrial Permits:

TN0025712 HBD Industries, Inc.

Discharger rating:	Minor
City:	Oneida
County:	Scott
EFO Name:	Knoxville
Issuance Date:	2/1/05
Expiration Date:	12/30/09
Receiving Stream(s):	Litton Fork Pine Creek at mile 0.1
HUC-12:	051301040402
Effluent Summary:	Contact and non-contact cooling water, and floor drainage water from Outfall 001
Treatment system:	Settling Basin

Segment	TN05130104048_0300
Name	Litton Fork Pine Creek
Size	2.5
Unit	Miles
First Year on 303(d) List	1998
Designated Uses	Livestock Watering and Wildlife (Supporting), Fish and Aquatic Life (Not Assessed), Recreation (Non-Supporting), Irrigation (Supporting)
Causes	Escherichia coli
Sources	On-site Treatment Systems (Septic Systems and Similar Decencentralized Systems), Sanitary Sewer Overflows (Collection System Failures)

Table 6-10. Stream Segment Information for HBD Industries, Inc.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Flow	All Year		MGD	DMax Load	Monthly	Instantaneous	Effluent
Flow	All Year		MGD	MAvg Load	Monthly	Instantaneous	Effluent
Oil and Grease (Freon EM)	All Year	15	mg/L	DMax Conc	Monthly	Grab	Effluent
TSS	All Year	40	mg/L	DMax Conc	Monthly	Grab	Effluent
Temperature (°C)	All Year		°C	DMax Conc	Monthly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Monthly	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Monthly	Grab	Effluent

Table 6-11. Permit Limits for HBD Industries, Inc.

Compliance History:
The following numbers of exceedences were noted in PCS:

2 Oil & Grease

Comments:
Manufacturing of Rubber and Plastics Hose and Belting.

APPENDIX II

ID	NAME	HAZARD
767016	Griffin	3
767007	Ridgetop	0
767009	Gables	1
017002	Butcher	1
257001	Oak Hill	L
257002	Walker Farms	1
257003	Jamestown Reservoir	L
257007	Gernt Properties	L
767002	Ponderosa	L
767003	Lay	2
767004	Pine Creek #4 (Howard)	L
767005	Laurel Branch	L
767006	Cooper Lake	3
767008	Conservation League	S
767010	Dexter Laxton	L
767011	Ronald King	0
767012	Troxel	S
767013	Swain	S
697001	Alvin C. York	3
257009	Hico	3
257010	Carrollwood Lake "B"	L
767014	Tilley	1
257012	Hidden Mountain #1	3
767015	Coggins Lake	L

Table A2-1. Inventoried Dams in the Tennessee Portion of the South Fork Cumberland River Watershed. *Hazard Codes: 1, High; (S, 2), Significant; (L, 3), Low; 0; Too small to regulate. TDEC only regulates dams indicated by a numeric hazard score.*

LAND COVER/LAND USE	ACRES	% OF WATERSHED
Bare Rock/Sand/Clay	3,318	0.5
Deciduous Forest	381,196	60.9
Developed Open Space	25,374	4.1
Emergent Herbaceous Wetlands	1	0.0
Evergreen Forest	12,196	1.9
Grassland/Herbaceous	54,122	8.6
High Intensity Development	378	0.1
Low Intensity Development	5,895	0.9
Medium Intensity Development	2,030	0.3
Mixed Forest	105,121	16.8
Open water	1,577	0.3
Pasture/Hay	32,406	5.2
Row Crops	173	0.0
Shrub/Scrub	1,006	0.2
Woody Wetlands	1,035	0.2
Total	**624,828**	**100.0**

Table A2-2. Land Use Distribution in the Tennessee Portion of the South Fork Cumberland River Watershed. *Data are from Multi-Resolution Land Characterization (MRLC) derived by applying a generalized Anderson level II system to mosaics of Landsat thematic mapper images collected every five years.*

ECOREGION	REFERENCE STREAM	WATERSHED (HUC 8)	
Cumberland Plateau (68a)	Rock Creek (68A01)	SF Cumberland River	05130104
	Laurel Creek (68A03)	SF Cumberland River	05130104
	Clear Creek (68A08)	Emory River	06010208
	Piney Creek (68A13)	Fort Loudoun/Watts Bar	06010201
	Mullens Creek (68A20)	Lower Tennessee	06020001
	Daddys Creek (68A26)	Emory River	06010208
	Island Creek (68A27)	Emory River	06010208
	Rock Creek (68A28)	Emory River	06010208
Plateau Escarpment (68c)	Ellis Gap Branch (68C12)	Lower Tennessee	06020001
	Crow Creek (68C15)	Guntersville Lake	06030001
	Crow Creek (68C20)	Guntersville Lake	06030001
Cumberland Mountains (69d)	No Business Creek (69D01)	Clear Fork Cumberland	05130101
	Flat Creek (69D03)	Emory River	06010208
	Stinking Creek (69D04)	Clear Fork Cumberland	05130101
	New River (69D05)	SF Cumberland River	05130104
	Round Rock Creek (69D06)	SF Cumberland River	05130104

Table A2-3. Ecoregion Monitoring Sites in Ecoregions 68a, 68c, 69d.

CODE	Name	AGENCY	AGENY_ID
106	TDEC/DNH Colditz Cove State Natural Area Site	TDEC/DNA	M.USTNHP 39
152	TDEC/DNH Paint Rock Creek Site	TDEC/DNA	S.USTNHP 237
154	TDEC/DNH Flint Fork Cove Site	TDEC/DNA	
201	USACOE-Nashville Client Site	USACOE-Nashville	
214	USACOE-Nashville Client Site	USACOE-Nashville	
219	USACOE-Nashville Client Site	USACOE-Nashville	
225	USACOE-Nashville Client Site	USACOE-Nashville	
300	TDOT SR 27 Mitigation/Permit Site	TDOT	
301	TDOT SR 27 Mitigation/Permit Site	TDOT	
302	TDOT SR 27 Mitigation/Permit Site	TDOT	
303	TDOT SR 27 Mitigation/Permit Site	TDOT	
304	TDOT SR 27 Mitigation/Permit Site	TDOT	
940	TDEC/DNH Ron Jones Report: Fentress County Site 24	TDEC/DNA	Sourcecode F88JON01TNUS

Table A2-4. Wetland Sites in the Tennessee Portion of the South Fork Cumberland River Watershed in TDEC Database. *TDEC, Tennessee Department of Environment and Conservation; DNA, Division of Natural Areas; TDOT, Tennessee Department of Transportation; USACOE, US Army Corps of Engineers.* ***This table represents an incomplete inventory and should not be considered a dependable indicator of the presence of wetlands in the watershed.***

APPENDIX III

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Beech Fork	TN05130104037_0600	5.9
Big South Fork Cumberland River	TN05130104013_1000	23.9
Black Wolf Creek	TN05130104032_0100	32.2
Bone Camp Creek	TN05130104032_0500	22.2
Brimstone Creek	TN05130104038_1000	10.9
Brushy Fork	TN05130104026_0710	11.5
Buffalo Creek	TN05130104044_1000	25.4
Cage Creek	TN05130104037_1200	4.5
Clear Fork River	TN05130104026_1000	27.2
Crooked Creek	TN05130104026_0800	38.4
Indian Creek	TN05130104038_0400	4.5
Laurel Fork	TN05130104016_0100	24.9
Ligias Creek	TN05130104037_0700	24.5
Mill Creek	TN05130104019_0100	22.5
Mill Creek	TN05130104038_0200	9.9
Montgomery Fork	TN05130104037_0400	30.7
New River	TN05130104037_1000	22.5
New River	TN05130104037_2000	34.1
New River	TN05130104037_3000	2.8
North White Oak Creek	TN05130104019_1000	9.2
North White Oak Creek	TN05130104019_2000	17.0
Paint Rock Creek	TN05130104037_0300	27.2
Phillips Branch	TN05130104037_0100	15.6
Pine Creek	TN05130104048_1000	3.2
Rock Creek	TN05130104010_1000	17.4
Round Rock Creek	TN05130104037_0610	17.3
Smoky Creek	TN05130104037_1300	34.1
Stony Fork	TN05130104037_0620	5.5
Thompson Creek	TN05130104010_0100	12.2
White Oak Creek	TN05130104032_1000	13.0
White Oak Creek	TN05130104032_2000	12.8

Table A3-1. Streams Fully Supporting Fish and Aquatic Life Designated Use in the Tennessee Portion of the South Fork Cumberland River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Bear Creek	TN05130104050_1000	2.6
East Branch	TN05130104050_0100	5.7
Pine Creek	TN05130104048_2000	4.1
Pine Creek	TN05130104048_3000	3.0
Roaring Paunch Creek	TN05130104051_1000	17.9
Straight Fork	TN05130104044_0500	25.4

Table A3-2. Streams Not Supporting Fish and Aquatic Life Designated Use in the Tennessee Portion of the South Fork Cumberland River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Alice Creek	TN05130104032_0510	6.6
Bandy Creek	TN05130104013_0300	8.3
Barn Creek	TN05130104026_0820	6.4
Big Branch	TN05130104026_0810	2.7
Big Bull Creek	TN05130104037_1400	12.3
Big Creek	TN05130104026_1100	7.8
Black Creek	TN05130104026_0100	12.1
Brushy Branch	TN05130104044_0100	2.9
Campbell Creek	TN05130104019_0110	5.4
Coon Branch	TN05130104032_0400	2.7
Coyle Branch	TN05130104019_0800	4.7
Crockett Creek	TN05130104019_0620	3.8
Cub Branch	TN05130104013_0100	2.1
Davis Creek	TN05130104032_0120	10.9
Dobbs Creek	TN05130104059_0200	1.3
Double Camp Creek	TN05130104037_0800	6.5
East Fork Pine Creek	TN05130104048_0400	2.8
East Prong Hill Creek	TN05130104019_0400	8.8
Flat Creek	TN05130104037_0200	4.4
Flint Fork	TN05130104059_0100	2.2
Fox Trap Branch	TN05130104050_0210	1.4
Grassy Fork	TN05130104013_0220	6.5
Groom Branch	TN05130104019_0700	3.7
Hall Branch	TN05130104032_0200	6.1
Hatfield Creek	TN05130104019_0610	6.5
Horse Creek	TN05130104026_0650	5.9
Huntsville Branch	TN05130104038_0100	3.8
Hurricane Creek	TN05130104026_0610	5.6
Indian Creek	TN05130104026_0300	8.4
Indian Fork	TN05130104037_1100	5.0

Table A3-3a.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Joe Branch	TN05130104026_1300	5.5
Joe Branch	TN05130104038_0300	4.9
Jones Branch	TN05130104051_0100	5.2
Langham Branch	TN05130104059_0110	4.7
Laurel Creek	TN05130104026_0400	7.1
Laurel Fork	TN05130104019_0600	23.4
Laurel Fork	TN05130104037_0900	10.1
Line Fork	TN05130104050_0400	0.8
Little Creek	TN05130104032_0600	3.5
Little South Fork	TN05130104059_1000	3.7
Litton Fork Pine Creek	TN05130104048_0300	2.5
Long Branch	TN05130104026_0640	11.0
Massengale Creek	TN05130104032_0520	8.4
Mill Branch	TN05130104048_0100	3.2
Mill Creek	TN05130104032_0110	7.4
Mill Seat Creek	TN05130104019_0500	5.1
Misc Tribs to Big South Fork Cumberland River	TN05130104013_0999	33.6
Misc Tribs to Brimstone Creek	TN05130104038_0999	26.0
Misc Tribs to Clear Fork River	TN05130104026_0999	24.7
Misc Tribs to New River	TN05130104037_0999	65.8
Misc Tribs to North White Oak Creek	TN05130104019_0999	11.6
Misc Tribs to Pine Creek	TN05130104048_0999	13.3
Misc Tribs to White Oak Creek	TN05130104032_0999	24.1
Nichol Creek	TN05130104019_0300	11.2
Nicks Creek	TN05130104037_0500	5.9
No Business Creek	TN05130104013_0500	17.9
North Fork Pine Creek	TN05130104048_0200	1.5
North Prong Clear Fork River	TN05130104026_0700	35.7
Parch Corn Creek	TN05130104013_0400	7.0
Phillips Branch	TN05130104037_1500	4.7
Pigeon Branch	TN05130104032_0300	4.1
Puncheon Camp Fork	TN05130104013_0200	12.2
Ramsey Branch	TN05130104026_0630	5.5
Rock Branch	TN05130104026_1200	6.7
Rock Creek	TN05130104026_0500	9.0
Rockhouse Fork	TN05130104044_0400	8.8
Shoal Creek	TN05130104026_0620	4.6
Skull Cave Creek	TN05130104026_0900	5.4
Skull Creek	TN05130104026_0200	7.1
Slavens Creek	TN05130104050_0300	1.5
Smith Creek	TN05130104044_0300	13.5
South Fork Pine Creek	TN05130104048_0500	1.7
South Prong Clear Fork River	TN05130104026_0600	30.4

Table A3-3b.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Spruce Creek	TN05130104019_0630	10.8
Stanley Creek	TN05130104044_0200	4.9
Station Camp Creek	TN05130104016_1000	16.2
Still Camp Branch	TN05130104026_1400	4.5
Unnamed Trib to Brimstone Creek	TN05130104038_0500	6.5
Unnamed Trib to East Fork Pine Creek	TN05130104048_0410	2.4
Unnamed Tributary to Jones Branch	TN05130104051_0110	11.6
West Branch	TN05130104050_0200	4.9
Williams Creek	TN05130104013_0210	12.9
Yellow Creek	TN05130104019_0200	6.9

Table A3-3c.

Table A3-3a-c. Streams Not Assessed for Fish and Aquatic Life Designated Use in the Tennessee Portion of the South Fork Cumberland River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Beech Fork	TN05130104037_0600	5.9
Big South Fork Cumberland River	TN05130104013_1000	23.9
Black Wolf Creek	TN05130104032_0100	32.2
Bone Camp Creek	TN05130104032_0500	22.2
Brimstone Creek	TN05130104038_1000	10.9
Brimstone Creek	TN05130104038_2000	7.1
Buffalo Creek	TN05130104044_1000	25.4
Clear Fork River	TN05130104026_1000	27.2
Laurel Fork	TN05130104016_0100	24.9
Ligias Creek	TN05130104037_0700	24.5
Mill Creek	TN05130104038_0200	9.9
Montgomery Fork	TN05130104037_0400	30.7
New River	TN05130104037_1000	22.5
New River	TN05130104037_2000	34.1
New River	TN05130104037_3000	2.8
Paint Rock Creek	TN05130104037_0300	27.2
Phillips Branch	TN05130104037_0100	15.6
Rock Creek	TN05130104010_1000	17.4
Round Rock Creek	TN05130104037_0610	17.3
Smoky Creek	TN05130104037_1300	34.1
White Oak Creek	TN05130104032_1000	13.0
White Oak Creek	TN05130104032_2000	12.8

Table A3-4. Streams Fully Supporting Recreation Designated Use in the Tennessee Portion of the South Fork Cumberland River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
East Fork Pine Creek	TN05130104048_0400	2.8
Litton Fork Pine Creek	TN05130104048_0300	2.5
North Fork Pine Creek	TN05130104048_0200	1.5
Pine Creek	TN05130104048_1000	3.2
Pine Creek	TN05130104048_2000	4.1
Pine Creek	TN05130104048_3000	3.0
South Fork Pine Creek	TN05130104048_0500	1.7
Unnamed Trib to East Fork Pine Creek	TN05130104048_0410	2.4

Table A3-5. Streams Not Supporting Recreation Designated Use in the Tennessee Portion of the South Fork Cumberland River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Alice Creek	TN05130104032_0510	6.6
Bandy Creek	TN05130104013_0300	8.3
Barn Creek	TN05130104026_0820	6.4
Bear Creek	TN05130104050_1000	2.6
Big Branch	TN05130104026_0810	2.7
Big Bull Creek	TN05130104037_1400	12.3
Big Creek	TN05130104026_1100	7.8
Black Creek	TN05130104026_0100	12.1
Brushy Branch	TN05130104044_0100	2.9
Brushy Fork	TN05130104026_0710	11.5
Cage Creek	TN05130104037_1200	4.5
Campbell Creek	TN05130104019_0110	5.4
Coon Branch	TN05130104032_0400	2.7
Coyle Branch	TN05130104019_0800	4.7
Crockett Creek	TN05130104019_0620	3.8
Crooked Creek	TN05130104026_0800	38.4
Davis Creek	TN05130104032_0120	10.9
Dobbs Creek	TN05130104059_0200	1.3
Double Camp Creek	TN05130104037_0800	6.5
East Branch	TN05130104050_0100	5.7
East Prong Hill Creek	TN05130104019_0400	8.8
Flat Creek	TN05130104037_0200	4.4
Flint Fork	TN05130104059_0100	2.2
Fox Trap Branch	TN05130104050_0210	1.4
Grassy Fork	TN05130104013_0220	6.5

Table A3-6a.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Groom Branch	TN05130104019_0700	3.7
Hall Branch	TN05130104032_0200	6.1
Hatfield Creek	TN05130104019_0610	6.5
Horse Creek	TN05130104026_0650	5.9
Huntsville Branch	TN05130104038_0100	3.8
Hurricane Creek	TN05130104026_0610	5.6
Indian Creek	TN05130104026_0300	8.4
Indian Creek	TN05130104038_0400	4.5
Indian Fork	TN05130104037_1100	5.0
Joe Branch	TN05130104026_1300	5.5
Joe Branch	TN05130104038_0300	4.9
Jones Branch	TN05130104051_0100	5.2
Langham Branch	TN05130104059_0110	4.7
Laurel Creek	TN05130104026_0400	7.1
Laurel Fork	TN05130104019_0600	23.4
Laurel Fork	TN05130104037_0900	10.1
Line Fork	TN05130104050_0400	0.8
Little Creek	TN05130104032_0600	3.5
Little South Fork	TN05130104059_1000	3.7
Long Branch	TN05130104026_0640	11.0
Massengale Creek	TN05130104032_0520	8.4
Mill Branch	TN05130104048_0100	3.2
Mill Creek	TN05130104019_0100	22.5
Mill Creek	TN05130104032_0110	7.4
Mill Seat Creek	TN05130104019_0500	5.1
Misc Tribs to Big South Fork Cumberland River	TN05130104013_0999	33.6
Misc Tribs to Brimstone Creek	TN05130104038_0999	26.0
Misc Tribs to Clear Fork River	TN05130104026_0999	24.7
Misc Tribs to New River	TN05130104037_0999	65.8
Misc Tribs to North White Oak Creek	TN05130104019_0999	11.6
Misc Tribs to Pine Creek	TN05130104048_0999	13.3
Misc Tribs to White Oak Creek	TN05130104032_0999	24.1
Nichol Creek	TN05130104019_0300	11.2
Nicks Creek	TN05130104037_0500	5.9
No Business Creek	TN05130104013_0500	17.9
North Prong Clear Fork River	TN05130104026_0700	35.7
North White Oak Creek	TN05130104019_1000	9.2
North White Oak Creek	TN05130104019_2000	17.0
Parch Corn Creek	TN05130104013_0400	7.0
Phillips Branch	TN05130104037_1500	4.7
Pigeon Branch	TN05130104032_0300	4.1

Table A3-6b.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Puncheon Camp Fork	TN05130104013_0200	12.2
Ramsey Branch	TN05130104026_0630	5.5
Roaring Paunch Creek	TN05130104051_1000	17.9
Rock Branch	TN05130104026_1200	6.7
Rock Creek	TN05130104026_0500	9.0
Rockhouse Fork	TN05130104044_0400	8.8
Shoal Creek	TN05130104026_0620	4.6
Skull Cave Creek	TN05130104026_0900	5.4
Skull Creek	TN05130104026_0200	7.1
Slavens Creek	TN05130104050_0300	1.5
Smith Creek	TN05130104044_0300	13.5
South Prong Clear Fork River	TN05130104026_0600	30.4
Spruce Creek	TN05130104019_0630	10.8
Stanley Creek	TN05130104044_0200	4.9
Station Camp Creek	TN05130104016_1000	16.2
Still Camp Branch	TN05130104026_1400	4.5
Stony Fork	TN05130104037_0620	5.5
Straight Fork	TN05130104044_0500	25.4
Thompson Creek	TN05130104010_0100	12.2
Unnamed Trib to Brimstone Creek	TN05130104038_0500	6.5
Unnamed Tributary to Jones Branch	TN05130104051_0110	11.6
West Branch	TN05130104050_0200	4.9
Williams Creek	TN05130104013_0210	12.9
Yellow Creek	TN05130104019_0200	6.9

Table A3-6c.

Table A3-6a-c. Streams Not Assessed for Recreation Designated Use in the Tennessee Portion of the South Fork Cumberland River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Bear Creek	TN05130104050_1000	2.6
Bear Creek	TN05130104050_1000	2.6
East Branch	TN05130104050_0100	5.7
Pine Creek	TN05130104048_2000	4.1
Pine Creek	TN05130104048_3000	3.0
Roaring Paunch Creek	TN05130104051_1000	17.9

Table A3-7. Stream Impairment Due to Siltation in the Tennessee Portion of the South Fork Cumberland River Watershed.

APPENDIX IV

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0101	0102	0103	0104	0105
Bare Rock/Sand/Clay	105	60	12	18	148
Deciduous Forest	37,103	26,499	19,476	32,741	31,539
Developed Open Space	472	769	561	1,269	1,916
Evergreen Forest	11	19	1	117	189
Grassland/Herbaceous	2,056	1,037	451	1,106	2,692
High Intensity Development	2	2			6
Low Intensity Development	34	69	14	75	207
Medium Intensity Development	15	8		11	79
Mixed Forest	2,292	1,001	683	1,858	2,801
Open Water	8	38		99	28
Pasture/Hay	93	118	91	197	1,742
Shrub/Scrub	32	67	130	92	125
Woody Wetlands	1	31	22	101	49
Total	**42,225**	**29,717**	**21,440**	**37,684**	**41,519**

Table A4-1a.

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0106	0107	0108	0201	0202
Bare Rock/Sand/Clay	288	25	220	176	658
Deciduous Forest	18,529	26,703	10,795	7,233	6,637
Developed Open Space	1,940	1,341	1,019	689	706
Evergreen Forest	176	329	145	2,082	755
Grassland/Herbaceous	2,775	1,393	1,909	3,428	5,753
High Intensity Development	26		35	14	2
Low Intensity Development	415	43	330	378	240
Medium Intensity Development	168	4	228	83	64
Mixed Forest	2,235	2,812	1,865	3,924	4,369
Open Water	173	3	193	60	50
Pasture/Hay	2,014	742	1,057	2,212	3,039
Row Crops				116	2
Shrub/Scrub	62	102	95		2
Woody Wetlands	187	205	107	1	1
Total	**28,989**	**33,703**	**17,998**	**20,396**	**22,276**

Table A4-1b.

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0203	0204	0205	0301	0302
Bare Rock/Sand/Clay	162	185	85	63	111
Deciduous Forest	10,824	6,524	10,733	9,316	9,109
Developed Open Space	1,406	1,429	1,174	1,059	800
Evergreen Forest	1,188	796	607	32	222
Grassland/Herbaceous	6,604	2,216	1,805	3,496	1,909
High Intensity Development		28	2	16	2
Low Intensity Development	370	540	311	310	159
Medium Intensity Development	70	169	37	260	30
Mixed Forest	8,571	4,842	3,423	1,226	3,577
Open Water	41	58	78	8	4
Pasture/Hay	3,226	3,718	1,198	930	916
Row Crops	5	9		1	
Shrub/Scrub	125	37	21	1	10
Woody Wetlands	2		117		
Total	**32,594**	**20,550**	**19,591**	**16,718**	**16,850**

Table A4-1c.

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0303	0304	0401	0402	0403
Bare Rock/Sand/Clay	107	81	121	103	13
Deciduous Forest	13,589	5,214	10,044	6,912	9,154
Developed Open Space	1,120	565	650	1,904	415
Emergent Herbaceous Wetlands			1		
Evergreen Forest	426	283	493	157	688
Grassland/Herbaceous	2,712	1,307	684	2,127	389
High Intensity Development	1			193	
Low Intensity Development	330	181	89	853	52
Medium Intensity Development	99	46	26	400	4
Mixed Forest	2,298	2,745	8,022	2,541	9,258
Open Water	7	2	276	178	4
Pasture/Hay	803	344	238	1,857	385
Row Crops			17		
Shrub/Scrub	20	6	8	1	2
Woody Wetlands	42	22	12	1	50
Total	**21,554**	**10,797**	**20,680**	**17,226**	**20,412**

Table A4-1d.

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0404	0405	0407	0408	0501
Bare Rock/Sand/Clay	34	234	137	16	130
Deciduous Forest	16,718	6,642	8,285	6,706	19,902
Developed Open Space	698	198	739	354	1,797
Evergreen Forest	860	150	257	451	1,267
Grassland/Herbaceous	1,178	1,274	2,164	203	2,895
High Intensity Development		14	14		23
Low Intensity Development	91	91	232	14	399
Medium Intensity Development	4	60	82		80
Mixed Forest	10,849	1,437	2,057	4,383	11,942
Open Water	148	10	36		73
Pasture/Hay	1,219	267	1,766	5	3,889
Row Crops	1	2	4		15
Shrub/Scrub	2	3	47		14
Woody Wetlands	17	10	44		14
Total	**31,820**	**10,392**	**15,864**	**12,131**	**42,440**

Table A4-1e.

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)	
	0502	0701
Bare Rock/Sand/Clay	23	
Deciduous Forest	8,149	6,120
Developed Open Space	294	91
Evergreen Forest	437	61
Grassland/Herbaceous	533	23
High Intensity Development	1	
Low Intensity Development	70	1
Medium Intensity Development	2	
Mixed Forest	3,802	310
Open Water	1	
Pasture/Hay	319	22
Shrub/Scrub		3
Total	**13,631**	**6,631**

Table A4-1f.

Table A4-1a-f. Land Use Distribution in South Fork Cumberland River Watershed by HUC-12. *Data are from 1992 Multi-Resolution Land Characterization (MRLC) derived by applying a generalized Anderson Level II system to mosaics of Landsat thematic mapper images collected every five years.*

HYDROLOGIC SOIL GROUPS
GROUP A SOILS have low runoff potential and high infiltration rates even when wet. They consist chiefly of sand and gravel and are well to excessively drained.
GROUP B SOILS have moderate infiltration rates when wet and consist chiefly of soils that are moderately deep to deep, moderately to well drained, and moderately coarse to coarse textures.
GROUP C SOILS have low infiltration rates when wet and consist chiefly of soils having a layer that impedes downward movement of water with moderately fine to fine texture.
GROUP D SOILS have high runoff potential, very low infiltration rates, and consist chiefly of clay soils.

Table A4-2. Hydrologic Soil Groups in Tennessee as Described in WCS. *Soils are grouped into four hydrologic soil groups that describe a soil's permeability and, therefore, its susceptibility to runoff.*

STATION	HUC 10	STREAM	AREA (MI^2)	DAILY FLOW			3Q2	1Q10	3Q10	7Q10	3Q20
				AVG	MAX	MIN					
3407875	0513010401	Bills Branch	0.67	1.9	100.0	0.0	na	na	na	na	na
3407876	0513010401	Smokey Creek	17.20	45.9	2000.0	0.0	na	na	na	na	na
3407877	0513010401	Bowling Branch	2.19	4.0	102.0	0.0	na	na	na	na	na
3407881	0513010401	Anderson Branch	0.69	1.5	122.0	0.0	na	na	na	na	na
3407882	0513010401	Lowe Branch	0.92	1.5	112.0	0.0	na	na	na	na	na
3407908	0513010401	New River	198.00	198.0	417.7	12200.0	1.9	na	na	na	na
3408000	0513010401	New River	314.00	621.9	42600.0	0.2	2.4	0.4	0.4	0.8	1.6
3408500	0513010401	New River	382.00	730.5	38000.0	0.1	4.0	0.4	0.4	0.5	0.2
3409500	0513010402	Clear Fork	272.00	475.7	24800.0	0.2	4.5	1.1	1.2	1.5	0.8
3409000	0513010403	White Oak Creek	13.50	23.8	1020.0	0.0	na	na	na	na	na

Table A4-3. Stream Flow Data from USGS Gaging Stations in the South Fork Cumberland River Watershed. *Data are in cubic feet per second (CFS). Data were obtained from the USGS web application StreamStats at http://water.usgs.gov/osw/streamstats. (na, data not available)*

AGENCY	STATION	LOCATION	HUC-12
11COEHUN	3BSF10021	Beech Fork @ RM 0.1	051301040101
TDECWPC	ECO69D05	New River @ RM 55.4	051301040101
TDECWPC	NEW048.0AN	New River @ RM 48.0	051301040101
11COEHUN	3BSF10023	New River @ RM 44.9	051301040102
TDECWPC	ECO69D06	Round Rock Creek @ RM 1.0 (Probation)	051301040102
11COEHUN	3BSF10020	Smoky Creek @ RM 0.9	051301040103
11COEHUN	3BSF10018	Montgomery Creek @ RM 0.5	051301040104
11COEHUN	3BSF10019	New River @ RM 32.5	051301040104
22TNOSM2	151004S1	Bud Mine Site Near Capitol Hill Above Buffalo Creek	051301040105
22TNOSM2	151004S2	Bud Mine Site Near Capitol Hill Above Buffalo Creek	051301040105
22TNOSM2	151004S3	Bud Mine Site Near Capitol Hill Above Buffalo Creek	051301040105
11COEHUN	3BSF10015	Paint Rock Creek @ RM 1.3	051301040106
11COEHUN	3BSF10016	New River @ RM 21.8	051301040106
11COEHUN	3BSF10017	Buffalo Creek @ RM 0.1	051301040106
11COEHUN	3BSF10014	Brimstone Creek @ RM 3.1	051301040107
11COEHUN	3BSF10006	New River @ RM 8.8	051301040108
11COEHUN	3BSF10013	Phillips Creek @ RM 0.3	051301040108
11NPSWRD	BISO_NPS_NR-1	New River at Mouth	051301040108
11NPSWRD	BISO_NPS_NR-3	New River Downstream of Hwy. 27 at USGS Gage	051301040108
11NPSWRD	BISO_TTU_NR	New River at Highway 27 Bridge	051301040108
TDECWPC	NEW008.8SC	New River @ RM 8.8	051301040108
11NPSWRD	BISO_NPS_CL-3	Clear Fork at Brewster Bridge	051301040203
11NPSWRD	BISO_NPS_CL-4	Clear Fork 100 Meters Upstream of Peters Bridge	051301040203
11NPSWRD	BISO_TTU_CFR	Clear Fork River at Peters Bridge	051301040203
11NPSWRD	BISO_TTU_CRC	Crooked Creek Near Mouth at Peters Bridge	051301040204
11NPSWRD	BISO_NPS_CL-1	Clear Fork at Mouth	051301040205
11NPSWRD	BISO_NPS_CL-2	Clear Fork at USGS Gage At Burnt Mill Bridge	051301040205
TDECWPC	CFORK003.8SC	Clear Fork River @ RM 3.8	051301040205
TDECWPC	WOAK015.7MG	White Oak Creek @ RM 15.7	051301040301
TDECWPC	BCAMP002.2MG	Bone Camp Creek @ RM 2.2	051301040302
TDECWPC	BWOLF000.1MG	Black Wolf Creek @ RM 0.1	051301040303
11COEHUN	3BSF10010	Whiteoak Creek @ RM 5.7	051301040304
11NPSWRD	BISO_NPS_WO-2	White Oak Creek 300m Downstream of Horseshoe Bend	051301040304
11NPSWRD	BISO_NPS_WO-3	White Oak Creek at Old Hwy. 52 Bridge	051301040304
TDECWPC	WOAK005.7MG	White Oak Creek @ RM 5.7	051301040304
11COEHUN	3BSF10003	South Fork Cumberland River @ RM 70.0	051301040401
11NPSWRD	BISO_NPS_BN-1	Bandy Creek at Mouth	051301040401
11NPSWRD	BISO_NPS_BN-2	Bandy Creek at Leatherwood Ford Road	051301040401
11NPSWRD	BISO_NPS_BN-3	Bandy Creek at County Line	051301040401
11NPSWRD	BISO_NPS_PI-1	Pine Creek at Mouth	051301040401
11NPSWRD	BISO_TTU_BSF	Big South Fork at Leatherwood Bridge	051301040401

Table A4-4a.

AGENCY	STATION	LOCATION	HUC-12
TDECWPC	BSFOR070.0SC	Big South Fork Cumberland River @ RM 70.0	051301040401
11NPSWRD	BISO_NPS_PI-3	Pine Creek 300m Downstream of Toomy At Railroad	051301040402
TDECWPC	PINE000.1SC	Pine Creek @ RM 0.1	051301040402
TDECWPC	PINE000.25SC	Pine Creek @ RM 0.25	051301040402
TDECWPC	PINE003.6SC	Pine Creek @ RM 3.6	051301040402
TDECWPC	PINE006.0SC	Pine Creek @ RM 6.0	051301040402
TDECWPC	PINE008.3SC	Pine Creek @ RM 8.3	051301040402
TDECWPC	PINE011.4SC	Pine Creek @ RM 11.4	051301040402
TDECWPC	PINESUR01	Pine Creek @ RM 8.8	051301040402
TDECWPC	PINESUR02	Pine creek @ RM 8.3	051301040402
TDECWPC	PINESUR03	Pine Creek @ RM 5.8	051301040402
TDECWPC	PINESUR04	Pine Creek @ RM 0.25	051301040402
TDECWPC	SFPIN000.3SC	South Fork Pine Creek @ RM 0.3	051301040402
11NPSWRD	BISO_NPS_LS-1	Laurel Fork of Station Camp Creek Mouth	051301040403
11NPSWRD	BISO_NPS_LS-3	Laurel Fork 100m Upstream of Crooked Branch	051301040403
11NPSWRD	BISO_NPS_SC-1	Station Camp Creek at Mouth	051301040403
11NPSWRD	BISO_NPS_SC-2	Station Camp Creek 200m Upstream of Laurel Fork	051301040403
11NPSWRD	BISO_NPS_SC-3	Station Camp Creek 20m Upstream of Charit Creek	051301040403
11NPSWRD	BISO_NPS_SC-4	Station Camp Creek 400m Downstream of Charit Creek	051301040403
TDECWPC	ECO68A03	Laurel Fork of Station Camp Creek @ RM 4.0	051301040403
11NPSWRD	BISO_NPS_GR-1	Grassy Fork of Williams Creek at Mouth	051301040404
11NPSWRD	BISO_NPS_GR-3	Grassy Fork 1.6km Upstream of Indian Rock Branch	051301040404
11NPSWRD	BISO_NPS_NB-1	No Business Creek 200m Upstream of Mouth	051301040404
11NPSWRD	BISO_NPS_NB-3	No Business Creek 200m Dwnstream of Tacket Creek	051301040404
11NPSWRD	BISO_NPS_PU-1	Puncheon Camp Fork of Williams Creek at Mouth	051301040404
11NPSWRD	BISO_NPS_PU-3	Puncheon Camp Fork at Grave Hill Road Crossing	051301040404
11NPSWRD	BISO_NPS_WL-1	Williams Creek at Mouth	051301040404
11NPSWRD	BISO_NPS_WL-2	Williams Creek 100m Upstream Of Puncheon Camp Fork	051301040404
11NPSWRD	BISO_NPS_WL-3	Williams Creek at Williams Creek Road Crossing	051301040404
11NPSWRD	BISO_NPS_BR-3	Bear Creek 300m Above Slaven Branch	051301040405
TVA	476139		051301040407
TVA	476140	UT to Jones Branch @ RM 0.28	051301040407
TVA	476141		051301040407
TDECWPC	JONES1T0.4SC	UT to Jones Branch @ RM 0.4	051301040407
TDECWPC	RPAUN015.7SC	Roaring Paunch Creek @ RM 15.7	051301040407
11NPSWRD	BISO_NPS_RO-3	Rock Creek 300m Downstream of Highway 154 Bridge	051301040408
TDECWPC	ECO68A01	Rock Creek @ RM 24.8	051301040408
TDECWPC	PICKETT	Pickett Lake @ Dam	051301040408
TDECWPC	THOMP004.8PI	Thompson Creek @ RM 4.8	051301040408
COEHUN	3BSF10012	North Whiteoak Creek @ RM 4.7	051301040501
COEHUN	3BSF1011	Laurel Fork @ RM 0.1	051301040501
12R2OSM	4700101S04	New River	051301040501

Table A4-4b.

AGENCY	STATION	LOCATION	HUC-12
TVA	600053	UT to Mill Creek	051301040501
TVA	600077	UT to South Prong Clear Fork @ RM 5.0	051301040501
TVA	600078	UT to South Prong Clear Frork @ RM 5.0	051301040501
11NPSWRD	BISO_NPS_NW-1	North White Oak Creek Mouth	051301040501
11NPSWRD	BISO_NPS_NW-3	North White Oak Creek 300m Upstream of Mill Ck	051301040501
TDECWPC	NWOAK014.7FE	North White Oak Creek @ RM 14.7	051301040501
11NPSWRD	BISO_NPS_LN-1	Laurel Fork North of White Oak Creek Mouth	051301040502
11NPSWRD	BISO_NPS_LN-3	Laurel Fork of North White Oak Creek at Highway 154	051301040502
11NPSWRD	BISO_NPS_BR-1	Bear Creek at Mouth	Kentucky
11NPSWRD	BISO_NPS_RO-1	Rock Creek 0.6km Upstream of Mouth	Kentucky
11NPSWRD	BISO_NPS_RP-1	Roaring Paunch Creek at Barthell	Kentucky
11NPSWRD	BISO_NPS_RP-3	Roaring Paunch Creek 100m Upstream of Hwy. 742	Kentucky
11NPSWRD	BISO_PP_01-BSY	Big South Fork River at Yamacraw Bridge	Kentucky
11NPSWRD	BISO_PP_02A-RCU	Big South Fork Upstream of Rock Creek	Kentucky
11NPSWRD	BISO_PP_02B-RCD	Big South Fork Downstream of Rock Creek	Kentucky
11NPSWRD	BISO_PP_02-RC1	Rock Creek - Big South Fork Tributary	Kentucky
11NPSWRD	BISO_PP_03-M68	Mine Drainage at Mine 68	Kentucky
11NPSWRD	BISO_PP_04A-WRU	Big South Fork River Upstream of Worley Creek	Kentucky
11NPSWRD	BISO_PP_04B-WRD	Big South Fork River Downstream of Worley Creek	Kentucky
11NPSWRD	BISO_PP_04C-WR	Worley Creek - Big South Fork Tributary	Kentucky
11NPSWRD	BISO_PP_04-M86	Mine Drainage at Mine 86	Kentucky
11NPSWRD	BISO_PP_05A-M88	UT Downstream Of Mine Drainage At Mine 88	Kentucky
11NPSWRD	BISO_PP_05B-M88	Big South Fork Downstream of Mine 88	Kentucky
11NPSWRD	BISO_PP_05-M88	Mine Drainage at Mine 88	Kentucky
11NPSWRD	BISO_PP_06-M61	Mine Drainage at Mine 88	Kentucky
11NPSWRD	BISO_PP_07A-SHU	Big South Fork Upstream of Slavey Hollow	Kentucky
11NPSWRD	BISO_PP_07B-SHD	Big South Fork Downstream of Slavey Hollow	Kentucky
11NPSWRD	BISO_PP_07C-SH	Slavey Hollow - Big South Fork Tributary	Kentucky
11NPSWRD	BISO_PP_07C-SH1	Slavey Hollow - A Big South Fork Tributary	Kentucky
11NPSWRD	BISO_PP_07-SH	Slavey Hollow - Big South Fork Tributary	Kentucky
11NPSWRD	BISO_PP_08-SR1	Mine Spoil at Roaring Paunch Confluence	Kentucky
11NPSWRD	BISO_PP_09A-BTH	Roaring Paunch Near Barthell Town	Kentucky
11NPSWRD	BISO_PP_09-BTH	Mine Drainage at Barthell Town	Kentucky
11NPSWRD	BISO_PP_10A-BTH	Discharge to Roaring Paunch Near Barthell Town	Kentucky
11NPSWRD	BISO_PP_10B-BTH	Culvert Seepage to Roaring Paunch	Kentucky
11NPSWRD	BISO_PP_10-BTH	Roaring Paunch Downstream of Barthell Town	Kentucky
11NPSWRD	BISO_PP_12A-RPU	Big South Fork Upstream of Roaring Paunch	Kentucky
11NPSWRD	BISO_PP_12B-RPD	Big South Fork Downstream of Roaring Paunch	Kentucky
11NPSWRD	BISO_PP_12-RP	Mouth of Roaring Paunch Creek	Kentucky
11NPSWRD	BISO_PP_13-M60	Mine Spoil Drainage at Mine #60	Kentucky
11NPSWRD	BISO_PP_14-M59	Mine Drainage at Mine #59	Kentucky
11NPSWRD	BISO_PP_15A-NGU	Big South Fork Upstream of Nancy Graves Creek	Kentucky

Table A4-4c.

AGENCY	STATION	LOCATION	HUC-12
11NPSWRD	BISO_PP_15B-NGD	Big South Fork Downstream of Nancy Graves Creek	Kentucky
11NPSWRD	BISO_PP_15-M59	Nancy Graves Creek Near Mine #59	Kentucky
11NPSWRD	BISO_PP_17-M58	Mine Drainage at Mine #58	Kentucky
11NPSWRD	BISO_PP_18-M58	Mine Drainage at Mine #58	Kentucky
11NPSWRD	BISO_PP_19-CO	Spring Located at Comargo	Kentucky
11NPSWRD	BISO_PP_20-DCU	Upstream into Devils Creek	Kentucky
11NPSWRD	BISO_PP_21A-DCU	Big South Fork Upstream of Devils Creek	Kentucky
11NPSWRD	BISO_PP_21B-DCD	Big South Fork Downstream of Devils Creek	Kentucky
11NPSWRD	BISO_PP_21-DC	Devils Creek Confluence	Kentucky
11NPSWRD	BISO_PP_22A-DCU	Big South Fork Upstream of Devils Creek	Kentucky
11NPSWRD	BISO_PP_22-DC1	Spring at Devils Creek	Kentucky
11NPSWRD	BISO_PP_23-M49	Mine Drainage at Mine #49	Kentucky
11NPSWRD	BISO_PP_24-M50	Three West Hollows Near Mine #50	Kentucky
11NPSWRD	BISO_PP_25-M48	Three West Hollows Downstream of Mine #48	Kentucky
11NPSWRD	BISO_PP_26-M48	Three West Hollows Near Mine #48	Kentucky
11NPSWRD	BISO_PP_27-M51	Mine Drainage at Mine #51	Kentucky
11NPSWRD	BISO_PP_28A-UMD	Big South Fork Downstream of Mine #46	Kentucky
11NPSWRD	BISO_PP_28-UMD	Mine Drainage Near Mine #46	Kentucky
11NPSWRD	BISO_PP_30A-UMD	Big South Fork Upstream of Biso_30-Umd	Kentucky
11NPSWRD	BISO_PP_30-UMD	Mine Drainage Confluence North of Biso_28-Umd	Kentucky
11NPSWRD	BISO_PP_31-M46	UT North of Biso_29-M46	Kentucky
11NPSWRD	BISO_PP_32A-TWH	Big South Fork Upstream of Three West Hollows	Kentucky
11NPSWRD	BISO_PP_32B-TWH	Big South Fork Downstream of Three West Hollows	Kentucky
11NPSWRD	BISO_PP_32-TWH	Three West Hollows - Big South Fork Tributary	Kentucky
11NPSWRD	BISO_PP_33-BH4	Mine Spoil Area at Blue Heron Tipple	Kentucky
11NPSWRD	BISO_PP_34B-BHD	Big South Fork Downstream of Blue Heron	Kentucky
11NPSWRD	BISO_PP_34-BH1	Mine Spoil Area at Blue Heron	Kentucky
11NPSWRD	BISO_PP_35A-BH3	Big South Fork Downstream of Blue Heron	Kentucky
11NPSWRD	BISO_PP_35B-BHN	Mine Spoil Area East of Blue Heron	Kentucky
11NPSWRD	BISO_PP_35-BH2	Mine Spoil Area East of Blue Heron	Kentucky
11NPSWRD	BISO_PP_36A-BHU	Big South Fork Upstream of Blue Heron	Kentucky
11NPSWRD	BISO_PP_36-BH3	Mine Spoil Area East of Blue Heron	Kentucky
11NPSWRD	BISO_PP_37-M43	Mine Drainage Near Mines #43 And #44	Kentucky
11NPSWRD	BISO_PP_38-M41	Mine Spoil Drainage Near Mine #41	Kentucky
11NPSWRD	BISO_PP_39A-LBC	Big South Fork River Downstream of Laurel Branch	Kentucky
11NPSWRD	BISO_PP_39B-LBC	Big South Fork River Downstream of Laurel Branch	Kentucky
11NPSWRD	BISO_PP_39-LBC1	Mine Spoil Drainage Near Laurel Branch	Kentucky
11NPSWRD	BISO_PP_40-LB1	Laurel Branch - Big South Fork Tributary	Kentucky
11NPSWRD	BISO_PP_41A-LBU	Big South Fork Upstream of Laurel Branch	Kentucky
11NPSWRD	BISO_PP_41B-LBD	Big South Fork Downstream of Laurel Branch	Kentucky
11NPSWRD	BISO_PP_41-LB2	Laurel Branch - Big South Fork Tributary	Kentucky
11NPSWRD	BISO_PP_42-BLC1	Blair Creek - Big South Fork Tributary	Kentucky

Table A4-4d.

AGENCY	STATION	LOCATION	HUC-12
11NPSWRD	BISO_PP_43A-BLC	Big South Fork Downstream of Blair Creek	Kentucky
11NPSWRD	BISO_PP_43-BLC2	Blair Creek - Big South Fork Tributary	Kentucky
11NPSWRD	BISO_PP_44-BSHU	Big Spring Hollow - Big South Fork Tributary	Kentucky
11NPSWRD	BISO_PP_45A-BSH	Big South Fork Upstream of Big Spring Hollow	Kentucky
11NPSWRD	BISO_PP_45B-BSH	Big South Fork Downstream of Big Spring Hollow	Kentucky
11NPSWRD	BISO_PP_45-BSH1	Big Spring Hollow - Big South Fork Tributary	Kentucky
11NPSWRD	BISO_PP_46-BSHD	Big Spring Hollow - Big South Fork Tributary	Kentucky
11NPSWRD	BISO_PP_47A-BCU	Big South Fork Upstream of Bear Creek	Kentucky
11NPSWRD	BISO_PP_47B-BCD	Big South Fork Downstream of Bear Creek	Kentucky
11NPSWRD	BISO_PP_47-BC	Bear Creek - Big South Fork Tributary	Kentucky
21KY	PRI008	South Fork Cumberland River at Blue Heron	Kentucky

Table A4-4e.

Tables A4-4a-e. STORET Water Quality Monitoring Stations in the South Fork Cumberland River Watershed*. COE, Corps of Engineers; NPSWRD, National Park Service Water Resources Division; OSM, Office of Surface Mining; TDECWPC, Tennessee Department of Environment and Conservation Division of Water Pollution Control; TVA, Tennessee Valley Authority. UT, Unnamed Tributary.*

FACILITY NUMBER	FACILITY NAME	SIC	SIC NAME	MADI	WATERBODY	HUC-12
TN0067172	Fairview Elementary School	4952	Sewerage System	Minor	UT @ RM 0.5 to Straight Fork @ RM 2.0	051301040105
TN0020753	Huntsville STP	4952	Sewerage System	Minor	New River @ RM 14.8	051301040106
TN0060186	Helenwood STP	4952	Sewerage System	Minor	Phillips Creek @ RM 4.1	051301040108
TN0030198	Robbins Elementary School	4952	Sewerage System	Minor	UT @ RM 0.8 to Black Creek @ RM 4.5	051301040205
TN0061603	Bandy Creek Campground	4952	Sewerage System	Minor	UT @ RM 0.2 to Bandy Creek @ RM 3.3	051301040401
TN0025712	HBD Industries	3052	Rubber and Plastic Hoses and Belts	Minor	Litton Fork Pine Creek @ RM 0.1	051301040402
TN0064424	Oneida STP	4952	Sewerage System	Minor	Pine Creek @ RM 7.2	051301040402

Table A4-5. NPDES Permittees in the South Fork Cumberland River Watershed. *SIC, Standard Industrial Classification; MADI, Major Discharge Indicator; UT, Unnamed Tributary.*

FACILITYNUMBER	PERMITEE	COUNTY	LIVESTOCK	WATERBODY	HUC-12
TNA000067	Dennis Hedgecoth	Fentress	Poultry	Big Creek	051301040202
TNA000066	Triple C Farms	Fentress	Poultry	Barger Branch	051301040204

Table A4-6. CAFO Sites in the South Fork Cumberland River Watershed.

FACILITY NUMBER	PERMITEE	SIC	SIC NAME	WATERBODY	HUC-12
TN0071439	Jorae Coal Co. (Mine #1)	1221	Coal Mining, Bituminous, Surface	Indian Fork	051301040107
TN0072834	National Coal Corporation (Mine #2)	1221	Coal Mining, Bituminous, Surface	New River, Ursery Branch, Double Camp Creek	051301040101
TN0063118	Premium Coal Company (Area #16)	1221	Coal Mining, Bituminous, Surface	Stony Fork	051301040102
TN0071307	Premium Coal Company (Area #18)	1221	Coal Mining, Bituminous, Surface	Ligias Fork, Cow Creek, Mud Suck Creek, Stony Flat Creek	051301040101
TN0046647	S&H Mining (Deep Mine #2)	1222	Coal Mining, Bituminous, Underground	Stony Fork Creek	051301040102
TN0052531	S&H Mining (Deep Mine #8)	1222	Coal Mining, Bituminous, Underground	Stony Fort Creek	051301040102
TN0053546	S&H Mining (Deep Mine #9)	1222	Coal Mining, Bituminous, Underground	Flat Creek	051301040101
TN0072168	S&H Mining (Deep Mine #11)	1222	Coal Mining, Bituminous, Underground	Stony Fork	051301040102
TN0072419	S&H Mining (Mine #12)	1222	Coal Mining, Bituminous, Underground	Stoney Fork	051301040102
TN0043222	Tennessee Mining (Baldwin Tipple)	1221	Bituminous Coal Mining Tipple and Loading	New River	051301040101
TN0048941	Tennessee Mining (Reclaimed Area #8)	1221	Bituminous Coal Mining Tipple and Loading	Mill Creek	051301040103
TN0049778	Tennessee Mining (Whitehead Mtn Deep Mine)#1	1222	Coal Mining, Bituminous, Underground	Shack Creek	051301040103
TN0049964	Tennessee Mining (Gum Br. Slurry Impoundment)	1221	Prep Plants, Bituminous Coal or Lignite	New River	051301040101
TN0050211	Tennessee Mining (Area # 15)	1221	Coal Mining, Bituminous, Surface	Shack Creek	051301040103
TN0050229	Tennessee Mining (Sandy Gap Preparation Plant)	1221	Prep Plants, Bituminous Coal or Lignite	Mill Creek	051301040103
TN0052795	Tennessee Mining (Whitehead Mountain Deep Mine #3 and #4)	1222	Coal Mining, Bituminous, Underground	Shark Creek	051301040103
TN0052965	Tennessee Mining (Deep Mine #1-Lower Fork)	1222	Coal Mining, Bituminous, Underground	Cage Creek	051301040101
TN0053651	Tennessee Mining (Brimstone and Sterling Tipples)	1221	Bituminous Coal Mining Tipple and Loading	Hutson Branch, Chimney Hollow, Brimstone Creek	051301040107
TN0054526	Tennessee Mining Whitehead Mtn Refuse #2	1221	Prep Plants, Bituminous Coal or Lignite	Mill Creek, Shack Creek	051301040107
TN0071226	Tennessee Mining (Windrock Deep Mine #2)	1222	Coal Mining, Bituminous, Underground	Wolfen Branch, Mill Creek	051301040101
TN0071510	Tennessee Mining (Fork Mountain Mine #2)	1221	Coal Mining, Bituminous, Surface	Indian Creek, UT to New River	051301040101

Table A4-7a

FACILITY NUMBER	PERMITEE	SIC	SIC NAME	WATERBODY	HUC-12
TN0071757	Tennessee Mining (Patterson Mountain Area #3)	1221	Coal Mining, Bituminous, Surface	UT tom Double Camp Creek, Laurel Fork	051301040101
TN0043800	U.S. Coal, Inc. (Washer/Tipple #1)	1221	Washeries, Bituminous Coal or Lignite	New River	051301040104
TN0062961	U.S. Coal, Inc. (Jordan Ridge Refuse Area)	1221	Prep Plants, Bituminous Coal or Lignite	Cross Creek, UT to New River	051301040102
TN0066109	U.S. Coal, Incorporated (Deep Mine #4)	1222	Coal Mining, Bituminous, Underground	UT to Prong of Nicks Creek	051301040102
TN0070891	U.S. Coal, Incorporated (Deep Mine #6)	1222	Coal Mining, Bituminous, Underground	UT to West Prong of Nicks Creek	051301040102
TN0071803	U.S. Coal, Incorporated (Deep Mine #8)	1222	Coal Mining, Bituminous, Underground	UT to Smoky Creek	051301040103
TN0072729	U.S. Coal, Incorporated (Deep Mine #9)	1222	Coal Mining, Bituminous, Underground	Green Branch	051301040103
TN0052752	Blevins Ditching and Excavation Company (Area #3)	1221	Coal Mining, Bituminous, Surface	Ramsey Branch	051301040202
TN0063398	East Fork (Area #1)	1221	Coal Mining, Bituminous, Surface	Fern Camp Creek	051301040201
TN0065706	Plateau Sand Company (Banner Quarry)	1442	Construction Sand Mining	North Prong Clear Fork River	051301040201
TN0063452	Tennessee Mining, Incorporated (Tenchtown #4)	1221	Coal Mining, Bituminous, Surface	Carney Hollow, Crooked Creek	051301040204

Table A4-7b.

Tables A4-7a-b. Active Permitted Mining Sites in the South Fork Cumberland River Watershed. *SIC, Standard Industrial Classification; UT, Unnamed Tributary.*

FACILITY NUMBER	FACILITY NAME	WATERBODY	HUC-12
TNG110232	West Ready Mix, Inc.	Sulphur Creek	051301040108
TNG110282	IMI Tennessee, Inc.	UT to Crooked Creek	051301040204

Table A4-8. Ready Mix Concrete Plants in the South Fork Cumberland River Watershed. *UT, Unnamed Tributary.*

LOG NUMBER	COUNTY	DESCRIPTION	WATERBODY	HUC-12
NRS01.120	Anderson		Cage Creek	051301040101
NRS03.092	Scott	Bridge Repair	Buffalo River	051301040105
NRS00.240	Scott	Water Withdrawal	UT to North Fork Pine Creek	051301040402
NRS03.215	Scott	Wetland Impact	Bear Creek	051301040405

Table A4-9. Individual ARAP Permits Issued January 2000 Through June 2004 in South Fork Cumberland River Watershed. *UT, Unnamed Tributary.*

FACILITY NUMBER	FACILITY NAME	SECTOR	RECEIVING STREAM	AREA*	HUC-12
TNR050781	Burress Auto Parts	M	UT to South Fork Cumberland River	1	051301040108
TNR051114	West Ready Mix, Incorporated	E	Sulphur Creek	1.7	051301040108
TNR053665	Scott County Municipal Airport	S	Pine Creek, Greasy Creek, Reed Branch	306	051301040108
TNR054426	Cumberland Wood Products	A	UT to Phillips Creek	12	051301040108
TNR056329	CHL Microspheres, Inc.	J	Phillips Creek	1	051301040108
TNR053952	Fentress County Quarry	J	UT to Rockcastle Creek	30	051301040204
TNR054452	Gernt Lumber Company	A	Long Branch	2	051301040204
TNR056514	Plateau Wood Products	A	UT to Crooked Creek	10	051301040204
TNR056519	Voiles Pine and Hemlock	A	UT to Crooked Creek	2.43	051301040204
TNR053007	Hartco Flooring Company	A, P	Pine Creek	10	051301040402
TNR053009	Hartco Flooring Company	A, P	Pine Creek	20	051301040402
TNR054459	Denim Processing, Incorporated	V	Pine Creek	1.5	051301040402
TNR054493	Miller Concrete Products	E	Pine Creek	3	051301040402
TNR055077	Oneida Railyard	P	Easement to Pine Creek	4	051301040402
TNR052070	Jim Barna Log Homes	A	Bear Creek	35	051301040403
TNR053924	Roberta Sanitary Land Fill	L, P	East Branch Bear Creek	800	051301040403
TNR051815	American bag Corporation	V	UT to Punch Creek	1.3	051301040407
TNR055049	Tallent Lumber Company	A	Lynn Branch to Mill Creek	5	051301040501

Table A4-10. Active Permitted TMSP Facilities in the South Fork Cumberland River Watershed. *Area, acres of property associated with industrial activity; UT, Unnamed Tributary. Sector details may be found in Table A4-11.*

SECTOR	TMSP SECTOR NAME
A	Timber Products Facilities
AA	Facilities That Manufacture Metal Products including Jewelry, Silverware and Plated Ware
AB	Facilities That Manufacture Transportation Equipment, Industrial or Commercial Machinery
AC	Facilities That Manufacture Electronic and Electrical Equipment and Components, Photographic and Optical Goods
AD	Facilities That Are Not Covered Under Sectors A Thru AC (Monitoring Required)
AE	Facilities That Are Not Covered Under Sectors A Thru AC (Monitoring Not Required)
B	Paper and Allied Products Manufacturing Facilities
C	Chemical and Allied Products Manufacturing Facilities
D	Asphalt Paving, Roofing Materials, and Lubricant Manufacturing Facilities
E	Glass, Clay, Cement, Concrete, and Gypsum Product Manufacturing Facilities
F	Primary Metals Facilities
G	Metal Mines (Ore Mining and Dressing) (RESERVED)
H	Inactive Coal Mines and Inactive Coal Mining-Related Facilities
I	Oil or Gas Extraction Facilities
J	Construction Sand and Gravel Mining and Processing and Dimension Stone Mining and Quarrying Facilities
K	Hazardous Waste Treatment Storage or Disposal Facilities
L	Landfills and Land Application Sites
M	Automobile Salvage Yards
N	Scrap Recycling and Waste and Recycling Facilities
O	Steam Electric Power Generating Facilities
P	Vehicle Maintenance or Equipment Cleaning areas at Motor Freight Transportation Facilities, Passenger Transportation Facilities, Petroleum Bulk Oil Stations and Terminals, the United States Postal Service, or Railroad Transportation Facilities
Q	Vehicle Maintenance Areas and Equipment Cleaning Areas of Water Transportation Facilities
R	Ship or Boat Building and Repair Yards
S	Vehicle Maintenance Areas, Equipment Cleaning Areas or From Airport Deicing Operations located at Air Transportation Facilities
T	Wastewater Treatment Works
U	Food and Kindred Products Facilities
V	Textile Mills, Apparel and other Fabric Product Manufacturing Facilities
W	Furniture and Fixture Manufacturing Facilities
X	Printing and Platemaking Facilities
Y	Rubber and Miscellaneous Plastic Product Manufacturing Facilities
Z	Leather Tanning and Finishing Facilities

Table A4-11. TMSP Sectors and Descriptions.

APPENDIX V

Land Treatment - Conservation Buffers			
	Field Borders (feet)	Streambank / Shoreline Protection (feet)	Riparian Forest Buffer (acres)
FY 2001	1000	4000	1
FY 2002			
FY 2003		600	15
FY 2004		11300	1
FY 2005		25500	

Table A5-1a. Land Treatment Conservation Practices (Conservation Buffers), in Partnership with NRCS in the Tennessee Portion of the South Fork Cumberland River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Erosion Control		
	Est. soil saved (tons/year)	Land Treated with erosion control measures (acres)
FY 2001	3924	169
FY 2002	7766	501
FY 2003	8529	646
FY 2004		
FY 2005		

Table A5-1b. Erosion Control Conservation Practices, in Partnership with NRCS in the Tennessee Portion of the South Fork Cumberland River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Nutrient Management				
	Waste Utilization (acres)	AFO Nutrient Mgmt Applied (acres)	Non-AFO Nutrient Mgmt. Applied (acres)	Total Applied (acres)
FY 2001		86	1881	1967
FY 2002			1832	1832
FY 2003			2004	2004
FY 2004		1064		1064
FY 2005	163	3915		4078

Table A5-1c. Nutrient Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of the South Fork Cumberland River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Comprehensive Nutrient Mgmt Plans			
	Planned Comprehensive Nutrient Mgmt Plans (number)	Applied Comprehensive Nutrient Mgmt Plans (number)	Total Comprehensive Nutrient Mgmt Plans (number)
FY 2001			
FY 2002			
FY 2003	1	1	2
FY 2004			
FY 2005			

Table A5-1d. Comprehensive Nutrient Management plans, Conservation Practices in Partnership with NRCS in the Tennessee Portion of the South Fork Cumberland River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Pest Management		
	Pest Mgmt. Systems (number)	Pest Mgmt. Systems (acres)
FY 2001	30	1982
FY 2002		1943
FY 2003		1912
FY 2004		1147
FY 2005		3871

Table A5-1e. Pest Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of the South Fork Cumberland River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Grazing / Forages					
	Prescribed Grazing (acres)	Prescribed Grazing (acres)	Fencing (feet)	Heavy Use Area Protection (acres)	Pasture and Hay Planting (acres)
FY 2001	1119				
FY 2002		1434			
FY 2003		1315			
FY 2004		2163	38747	151	164
FY 2005	1234	1865	60685	1	466

Table A5-1f. Grazing/Forages Conservation Practices in Partnership with NRCS in the Tennessee Portion of the South Fork Cumberland River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Tree & Shrub Practices				
	Land Improved through Forest Stand improvement (acres)	Total Tree & Shrub Estab. (acres)	Forestland Re-established or improved (acres)	Use Exclusion (acres)
FY 2001	775	40	815	
FY 2002	978	37	1015	
FY 2003	89	6	95	
FY 2004	266		266	1
FY 2005	1723		1723	6

Table A5-1g. Tree and Shrub Conservation Practices in Partnership with NRCS in the Tennessee Portion of the South Fork Cumberland River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Land Treatment - Tillage & Cropping				
	Residue Mgmt, No-till, Strip till (acres)	Tillage & Residue Mgmt Systems (acres)	Conservation Crop Rotation (acres)	Cover Crop (acres)
FY 2001		7		
FY 2002				
FY 2003				
FY 2004			80	
FY 2005	12	12	617	274

Table A5-1h. Land Treatment Conservation Practices (Tillage and Cropping), in Partnership with NRCS in the Tennessee Portion of the South Fork Cumberland River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Waste Systems		
	Waste Systems Planned (number)	Waste Systems Applied (number)
FY 2001	4	5
FY 2002		
FY 2003		
FY 2004		
FY 2005		

Table A5-1i.Waste System Conservation Practices in Partnership with NRCS in the Tennessee Portion of the South Fork Cumberland River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Waste Management Facilities				
	Waste Storage Facility (number)	Composting Facility (number)	Waste Trt. Lagoon (number)	Total Facilities (number)
FY 2001	4	5		9
FY 2002				
FY 2003		1		1
FY 2004				
FY 2005	1	1	1	3

Table A5-1j.Waste Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of the South Fork Cumberland River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Wildlife Habitat Management			
	Upland Habitat Mgmt (acres)	Wetland Habitat Mgmt (acres)	Total Wildlife Habitat Mgmt Applied (acres)
FY 2001	1264	8	1272
FY 2002	1451		1451
FY 2003	173	2	175
FY 2004			
FY 2005	1633		1633

Table A5-1k. Wildlife Habitat Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of the South Fork Cumberland River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Water Supply			
	Pipeline (ft)	Pond (number)	Watering Facility (number)
FY 2001			
FY 2002			
FY 2003			
FY 2004		2	1
FY 2005	6200	3	5

Table A5-1l. Water Supply Conservation Practices in Partnership with NRCS in the Tennessee Portion of the South Fork Cumberland River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

COMMUNITY	AWARD DATE	AWARD AMOUNT
Sunbright	6/25/91	$116,240

Table A5-2. Communities in the Tennessee Portion of the South Fork Cumberland River Watershed that have received Clean Water State Revolving Fund Grants or Loans since the inception of the program.

PRACTICE	NRCS CODE	NUMBER OF BMPs
Unknown	0	2
Waste Management System	312	2
Waste Storage Facility	313	1
Composting Facility	317	8
Conservation Tillage	329	11
Critical Area Planting	342	2
Diversion	362	2
Pond	378	38
Fence	382	10
Acid Mine Reclamation	454	9
Use Exclusion	472	14
Pasture/Hay Planting	512	70
Prescribed Grazing	528	1
Mine Reclamation	543	6
Heavy Use Area	561	23
Spring Development	574	2
Stream Crossing	578	6
Streambank Protection	580	1
Watering Facility	614	15
Water/Sediment Control Basin	638	1
TOTAL BMPs	**-**	**224**

Table A5-3. Best Management Practices Installed by Tennessee Department of Agriculture and Partners in the Tennessee Portion of the South Fork Cumberland River Watershed.